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Air Repair

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Air Repair

A QUARTERLY MAGAZINE DEVOTED TO AIR PURIFICATION

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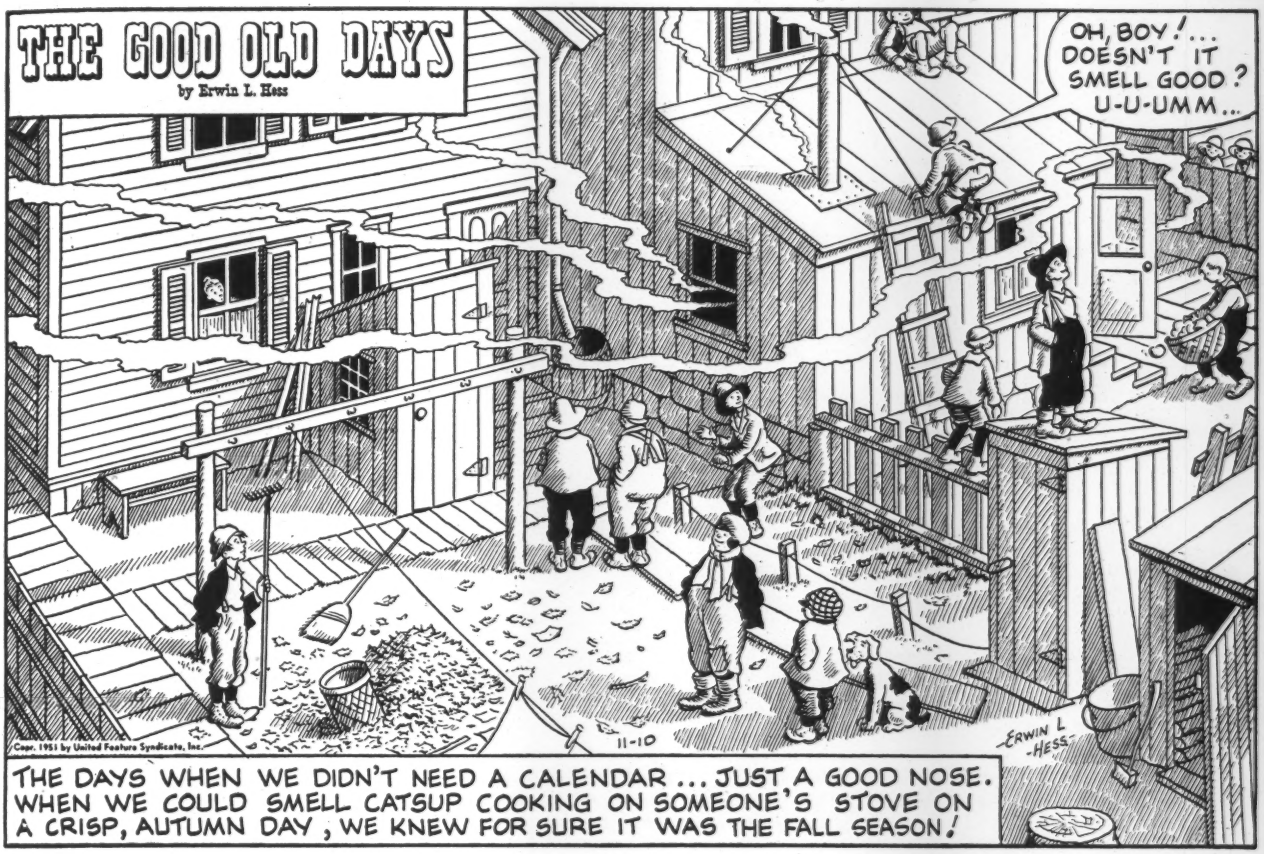

THE GOOD OLD DAYS
by Erwin L. Hess
OH, BOY!... DOESN'T IT SMELL GOOD? U-U-UMM...
Copr. 1951 by United Feature Syndicate, Inc.
11-10
ERWIN L HESS
THE DAYS WHEN WE DIDN'T NEED A CALENDAR ... JUST A GOOD NOSE. WHEN WE COULD SMELL CATSUP COOKING ON SOMEONE'S STOVE ON A CRISP, AUTUMN DAY, WE KNEW FOR SURE IT WAS THE FALL SEASON!

COURTESY UNITED FEATURE SYNDICATE

Typical of the friendly smells created by the processing of many kinds of food is this cartoon, by Erwin L. Hess, which ran in many newspapers last fall. Yet to some persons concentrated odors of even the best foods become overpowering, and therefore a nuisance. What to do about these odors is a problem confronting every air pollution control official, as well as the authors of the odors.

Odor Control In Los Angeles County

by Earl W. Edelen and
Howard L. Clark
Los Angeles County Air Pollution
Control District

Foreword by

President John L. Hodges

A boy I knew years ago always got himself a vacation job delivering packages for a candy and pastry shop. The place was a boy's paradise—full of chocolates, bonbons, hard candy, cakes, and pies. Double-rich malted milk and banana splits were an accepted finish to every luncheon, and the aroma of sugar, spice, and hot baked goods filled the air inside and outside of the shop all day long.

The boy's mother warned him against overindulging. She told him the management encouraged the employees to eat their fill because they would soon get tired of sweet things, thus saving wear and tear on the digestive apparatus, as well as enabling the shop to show a profit at the end of the month.

The boy, being a good boy, obeyed his mother. But one day the shop was short of help and asked the boy if he had a chum who would be interested in working there, the same as he. The boy had a chum, and he brought him along the next day.

The second boy would not at first believe his ears when he heard that he could gorge himself to his heart's content at the expense of the management. The first boy warned him he might get ill, but he paid no attention.

You know the rest. They boy did go home ill that night. The next day he showed up for work, but wouldn't remain in the shop an instant longer than necessary. The smell of sweets made him ill, and so he spent the day, when not delivering "specials," on the curb outside the shop. And you couldn't get him to eat one bit of sweet the rest of the time he worked there!

I have never forgotten that boy. He comes to mind constantly, now that I am engaged in the business of trying to keep municipal air clean. For he accentuates one very important phase of this work: an odor which might be quite pleasant to one person will make another very ill.

The analogy in case of the boy is not quite parallel, but it is close enough to bear study.

PHOTO COURTESY WORLD TELEGRAM & SUN

This is a remarkable picture since no smoke is issuing from the five stacks of Joseph Martinson & Company, located in downtown New York, a coffee and tea merchant. Normally, in roasting coffee, a heavy smoke develops, and at the end of a roasting, in the color checking period, water is used to halt the roasting process, resulting in a large amount of steam. Martinson's, however, have installed a smoke elimination device which recirculates smoke and steam through the gas burners of the roaster, completely incinerating smoke, steam, and odor. In addition, chaff particles are collected into a large incinerator and burned. Martinson's were the first to have this new equipment installed. It is the product of Jabez Burns & Sons, New York, manufacturers of food processing equipment.

There are those who cannot pass a coffee roasting plant without becoming ill, and there are people who violently dislike the smell of ketchup when they get it in large doses. And these are odors which many people find invigorating. What about odors emanating from tanneries, fish canneries, paper mills, rendering plants?

This subject calls for a great deal of study on the part of air pollution control officials. Is, for instance, a bad odor emitted into the atmosphere necessarily as part of an industrial process rightfully termed air pollution, or is it merely a nuisance?

If it is a nuisance, how many people must it affect in order to be a public nuisance? And if complaints are received, is the above condition covered by a law reading roughly as follows:

"It is the duty of the Bureau of Air Pollution Control to investigate complaints regarding smoke and other air polluting conditions and to inaugurate necessary and proper steps to abate the condition and the nuisance therefrom."

Description of the violation would read as follows:

"It shall be unlawful for any person to cause, suffer, or allow to be discharged into the open air noxious fumes or gases of a character and in quantity which is detrimental to or endangers the public health."

When such a case comes up for discussion, what evidence would be needed to cover the case by the Bureau of Air Pollution Control? Would "opinions" be accepted at a hearing or in court?

Would the Bureau need 1) medical testimony, both physiological and psychological; 2) engineering facts, character of the process, nature of emissions and measurement of material or concentrations of any measureable gases present causing the odor?

It is most difficult to measure an odor, since odors affect each individual differently—witness the case of the boy in the pastry shop. If medical testimony is indicated, then it may be presumed that odors may have an effect on the health of the people. Such a condition may be difficult to prove, except on the basis of psychology. There are, for instance, country folks who believe that their children should stay away from dogs because a dog's breath is poisonous.

If, of course, an odor violation is adjudicated as a nuisance and then is prosecuted under another ordinance, the air pollution control official can be relieved of worry about this condition, but it doesn't solve the problem.

A noxious gas does not have to be toxic or poisonous in order to be offensive. Yet there are many offensive odors in city industrial zones. Can residents in those areas justifiably make complaints? If so, what concentration must there be before the odor can be classed as detrimental to public health? It would be great for the Association if these random thoughts, plus those of Messrs. Edelen and Clark, would stimulate discussion which could be printed in a forthcoming issue. And now for their most interesting paper:

Malodors in any air pollution picture are likely to incur more public vexation than any other class of atmospheric contaminants.

Ordinarily they occur in areas closely

associated with a few particular industries. Seldom is it ever difficult to assess causes to the responsible source or sources if a competent investigator is on hand to witness the offence.

Remedial measures, however, are often derived only after considerable research and engineering problems have been overcome. Occasionally the control methods adopted deliver a finer product, may accelerate production, reduce costs, or, in some cases, result in increased profit for an enterprising concern.

The principal sources of disagreeable odors in the Los Angeles area have been fish canneries, rendering plants, oil refineries, paint and varnish works and chemical industries. Although these problems have not been completely solved, much progress has been made in reducing local nuisances and a number of progressive industries have benefited from the resulting alteration of their processes.

Fish Meal Problems

A good case in point is that of Terminal Island and Long Beach fish canneries which had encountered considerable difficulties from fish meal odors. Fish meal is a by-product in the canning of fish and is used as a major constituent of several kinds of animal feed. Fish scraps and entrails, from which the oil has been extracted, are ground and dehydrated to derive the final product.

Former dehydrators, which were gas or oil-fired, permitted flames to come in direct contact with some of the wet fish meal and thus burn it. This produced excessively obnoxious odors which drifted into surrounding residential areas and impaired personnel efficiency in the plants. When the old method of dehydration released odors in quantity, it was necessary for state inspectors to close down the affected cannery because it was impossible to determine freshness of the fish by smell.

Low-Temperature Dehydration

Incineration was attempted first to eliminate the odors. The gases containing them were passed through a gas-fired system in which the temperature was maintained at a minimum of 1,400 deg. F. Although this method was effective in eliminating odors, it was too expensive. The canneries began experiments with low-temperature dehydration.

DINER DATE

The young people on the cover are at the age when they are having the time of their lives. Dinner, then the movies, then the slow walk home. They are just beginning to understand what creature comforts mean. At their age these include ketchup on the barbecued bun, sliced chicken sandwich, tuna fish salad, piping hot coffee, brand-new shoes and a belt for the boy, and dab of fragrance for the girl.

And what has all this to do with air pollution? A good question. To get these comforts, the human race must also endure the manufacturing processes that produce them. The smell of roasting coffee is often offensive to those living near a coffee plant, and the fish oil coming from tuna scraps, which forms the feed for chickens, etc., is anything but pleasant to the passing nostril. Tanning the leather for the boy's belt and shoes causes odors to waft through the district which sicken many, and even the smell of ketchup cooking has its disadvantages for some. The perfume distillery which provides the girl with the dab of perfume isn't always considered a good neighbor. Overcoming these odor disadvantages is part of the study of air pollution now being undertaken on a worldwide basis.—Photograph by Underwood and Underwood.

In the old system it was necessary to heat about 20,000 cu. ft. of air. Flame was forced into the intake end at a temperature over 800 deg. F. and the meal was delivered, whether sufficiently dried or not, at about 180 deg. F. At present 2,000 to 3,000 cu. ft. more air is introduced to the low-heat system at 500 deg F. or less and the meal is drawn out by a blower unit only when the desired dryness has been attained at 160 to 175 deg. F.

While the cost of a low-temperature unit ranged between $12,000 and $25,000, and power had to be increased as much as 10 percent, gas consumption was cut as much as 10 percent and maintenance costs were actually reduced. One cannery recovered its $13,000 investment in one year.

Improved Product

In every case the quality of the fish meal was definitely improved, and as much as 15 percent more meal was recovered with the new process. The resultant product was approximately 10 percent richer in nutritional values than produced in plants with the old high-heat dehydration systems. So much increased was the protein, lysine and Vitamin B_{12} content in one case that the cannery realized $4.80 a ton more for its fish meal.

Thus, not only were the disagreeable odors from burned fish meal eliminated, but the quality and quantity of the product improved. Lost personnel time and lost production time from shut-downs by state inspectors were minimized as well. All canneries in the Los Angeles area have installed low-temperature dehydration systems as a result of these benefits.

Odors from stick water in fish canning processes became increasingly objectionable with age. One processing plant collects stick water from several canneries to reclaim oil, proteins, and other valuable ingredients. An efficient Venturi scrubber removes odors from this process and exhausts the waste into the sewer system. This has reduced annoying odors from this source to a minimum. One large cannery reports that treating stick water in storage tanks with enough sulfuric acid to maintain a strong acid condition reduces odors as much as 90%.

Rendering Plant Odors

Objectionable odors from the rendering industry are generally confined to plants which process other than freshly killed animals. Fresh-meat packing plants usually are able to control their limited odors with Venturi jet condensers or barometric condensers.

The so-called "dead" animal rendering plants, however, are responsible for more intense odors and thus have a greater problem. Although a few in the Los Angeles area have been able to use Venturi jet condensers successfully, most of these plants have had to rely upon incineration to abate odors.

Although these methods appear to reduce the odor nuisance in surrounding residential areas, odors are still detectable in the immediate vicinity of each

plant. Odors which persist generally can be traced to malfunction of incineration units. Often odorous vapors are blown into these units too rapidly or the conducting systems are not airtight. Careless plant maintenance may also account for rendering plant odors.

Refinery Odors

One of the greatest sources of malodors in oil refineries is the production of mercaptans. They all contain sulfur and are commonly derived from high-sulfur crudes. All of the sulfur in these crudes is not necessarily in the form of mercaptans, but certain refinery processes, such as thermal cracking, convert sulfur compounds in the crudes to mercaptans.

Mercaptans are ordinarily removed from petroleum products by treatment in a variety of processes, practically all of which rely upon caustic action. This presents the problem of disposing of the mercaptans or the spent caustic solution containing them. They may be handily accomplished by selling the mercaptans for warning deodorants in natural gas. They also serve as intermediate chemicals in the organic synthesis of such products as amino acids used in cattle feed.

In gasoline treating, mercaptans are converted into disulfides which are not particularly obnoxious. The disulfides are left in the gasoline in some processes and in others they are removed and either burned in refinery furnaces or blended with fuel oils. In any case the odors from the finished product are not obnoxious.

For the most part, mercaptans are destroyed by burning in fireboxes of boilers or stills. This forms sulfur dioxide which, though an air pollutant, does not have an obnoxious odor in very low concentration. The very disagreeable, garlicky odor of ethyl mercaptan is detectable by smell in concentrations of three parts per billion by volume or seven milligrams per million liters. A thousand times as much sulfur dioxide is necessary before it is detectable by smell.

Paint and Varnish Odors

Paint and varnish plants are often responsible for the discharge of highly irritating substances such as acrolein, other aldehydes and fatty acids from their processes. Most plants in the Los Angeles area employ scrubbers to reduce these offensive odors. Vapors which are driven off in varnish or oil-boiling kettles are conducted to an aspiration system. Cold water entering the system draws in the vapors and, through turbulent mixing, absorbs the water-soluble substances and carries them into a sewer system. Some units have air vents fitted with water sprays to further wash gases being exhausted to the atmosphere. Unfortunately, most of such jet condensers recirculate the water over and over and permit it to become saturated with odor-producing compounds before being replaced with fresh water.

From an engineering standpoint, incineration of paint and varnish cooker discharges is the surest and most efficient method of reducing the offensive odors which they produce. Blowers force vapors from the cooking kettles through a high-velocity Venturi throat. The Venturi feature minimizes one of the principal drawbacks to incineration by preventing flashbacks.

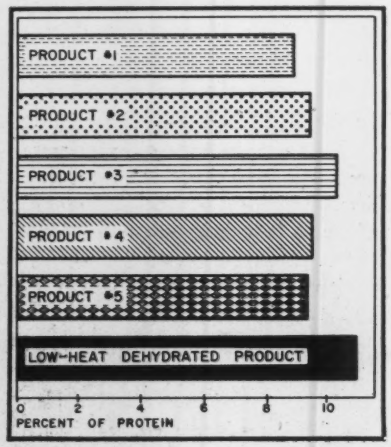
Some systems are equipped with an automatic fuel and blower cut-off in the event of failure anywhere in the system. Incineration is usually more expensive than scrubbing, but efficient combustion will convert the most troublesome odors into innocuous carbon dioxide and water.

Conclusion

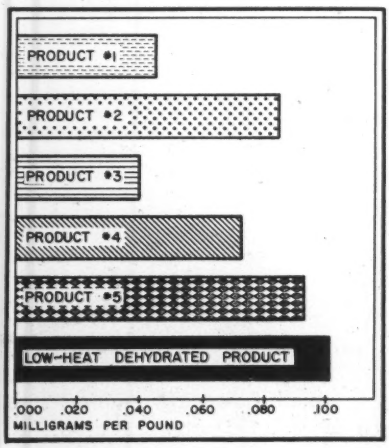
These are just a few of the methods for the reduction of malodors in Los Angeles industries. The success of these methods is reflected in the decreasing number of odor nuisance complaints since controls have been established.

When the Los Angeles County Air Pollution Control District first became a going organization, these complaints flowed in continuously. Residents of districts adjacent to the fish canneries periodically complained of strong fish odors in the air when winds carried them into the residential areas. A few other cities were repeatedly disturbed by animal rendering odors from nearby plants. Only wind direction determined which community complained of oil refinery odors. Disagreeable odors from paint and varnish works were restricted to smaller areas but were frequent. These complaints, by nature and number, are in direct contrast to those of the present day, which seldom exceed one each month. In virtually every case current complaints can be attributed to breakdowns in equipment or careless operation.

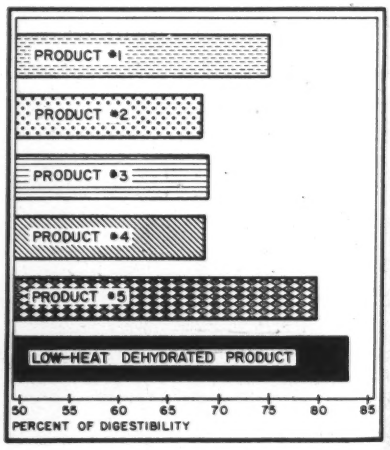
Lysine Content of Fish Meal



Vitamin B_{12} in Fish Meal



Protein Digestibility of Fish Meal



GOB PILES

While These Burning Refuse Piles Are Often Fascinating to See, Particularly at Night, They Provide No Fascination for Either Owner or Smoke Inspector, to Whom They Are Nothing But an Added Problem

When the Allegheny County Bureau of Smoke Control devotes 63 out of 79 pages of its latest annual report to gob piles, the subject is worth study. Accordingly, we herewith present a resume of the report, and will welcome discussion for publication in future issues.

For those who are luckily unfamiliar with gob piles, an explanation is in order. These piles consist of refuse accumulated during coal mining and preparation operations. This refuse is usually dumped as close to the tipple as convenient, and may later be used as fill.

Years ago scant attention was paid to these piles. At the best they were eye sores, at the worst, when ignited, they gave off acrid odors and undesirable smoke. Pyrotechnically they were often quite attractive, and were pointed out to visitors making their nocturnal rounds of the district.

There are between 20 and 25 of such piles burning in Allegheny County at the present time, and literally hundreds of others which may fire at any time. The County also has numerous records of piles that have been dormant for as long as 20 years, and which, for no discernible reason, suddenly ignite.

The Western Pennsylvania Coal Operators' Association (an AP&SPAA member), established a fellowship at Mellon Institute two and a half years ago for the purpose of studying the control of gob piles and of means for preventing their combustion. The investigation, headed by Dr. William L. Nelson, is important and complicated. The School of Mineral Industries at Pennsylvania State College is also undertaking a study, and two gob pile committees, formed by the Western Pennsylvania Coal Operators' Association and the Central Pennsylvania Coal Producers' Association (an AP&SPAA member) are coordinating their activities. Progress is being made, but a foolproof solution has not yet been presented.

County Statistics

An enormous amount of coal is used in Allegheny County yearly. As a matter of fact, Allegheny County enjoys the highest concentration of industrial activity for any similar community in the world. The steel industry alone has an annual ingot capacity of approximately 14,000,000 tons. This tonnage is produced in 132 open hearth furnaces, 29 blast furnaces, more than 1,000 heating and reheating furnaces, and approximately 1,675 by-product coke ovens.

The annual coal consumption in the county is in excess of 50,000,000 tons, most of it for industrial uses. Less than 1,500,000 tons are burned for home heating. Much of this coal is mined in Allegheny County, and that is the reason for the great prevalence of gob piles.

These piles are fired by spontaneous combustion, and the studies being undertaken at present include an attempt to determine, by physical means, the rise of temperature in the piles to the point where the material becomes combustible.

Differential Adiabatic Calorimeter

For the past year Dr. Nelson has been engaged almost entirely in the development of apparatus capable of measuring the spontaneous heating tendency of coal and associated pyrites at normally prevailing atmospheric temperatures. Such an apparatus, called a differential adiabatic calorimeter, was developed and is undergoing further tests.

These indicate that the device will provide valuable information on the self-heating characteristics of coal and pyrite, and they further indicate that pyrite, in

Like a scene from Dante's Inferno is this view of a Pennsylvania gob pile. Gob piles are offensive to the vision even when dormant, but when they ignite and give off smoke and acrid fumes, they become offensive to the smell, irritating to the eyes, both physically and esthetically, and result in serious nuisances.

the absence of moisture vapor, heats spontaneously much faster than coal.

"It is impossible to predict," Dr. Nelson stated, "to what extent our thoughts on the construction of refuse piles will be affected by information we hope to obtain.

"We have conflicting reports on thermal effects of low temperature oxidation of coal. We know little about many factors involved, such as particle size, surface area (especially internal surface area), banded structure, and effects of moisture, oxygen concentration, and associated pyrite.

"We intend to improve our knowledge, and hope that our investigations will lead to treatment of the refuse so as to reduce its tendency to heat spontaneously, as well as to improvements in the sealing of refuse."

Dr. Nelson made a number of suggestions regarding the constructon of refuse piles, and will be glad to work with any operator who either wishes to improve the construction of an existing pile or to build a new pile.

Detailed Investigations

Most interesting were the detailed investigations made by Pennsylvania State College and included in the Allegheny County report.

Two out of the five companies checked had no gob pile trouble, but the other three did. In one operation the refuse is crushed so that three-fourths of it is below 1/4 in. in size. The refuse is then piled in layers 5 ft. thick and is compacted by having trucks and bulldozers run over it. The exposed edges of the pile are not sealed and no capping is used. The crushing and compacting of the refuse, plus great care in laying it down, made freedom from gob pile fires possible.

End Dump vs. Side Dump

Two operations, mining the same seam within a few miles of each other, were carefully studied. There was no apparent appreciable difference in mining technique between the two mines, but one mine used an end dump larry for handling refuse from mine and cleaning plant, while the other used a side dump larry. Both hand-picked the coal.

The mine using the side dump larry was not troubled with fires, although its gob pile is 40 years old. But the end-dumped piles have caught fire, and several older piles burned out completely.

A fire in one of these end-dumped piles was extinguished only after the burning section had first been isolated by a cut, and then sprayed with 1,000 gal. of water per minute, 24 hours a day, for 11 months. The spraying cost was $6,683.

Quenching with Foam

Tests made in collaboration with engineers of the Pyrene Manufacturing Company for smothering gob pile fires with foam were interesting, but not conclusive to date. They worked well in the laboratory on simulated gob piles, but trouble was encountered in the field because satisfactory foam could not be produced with available pressure.

Foam is made by adding a foam-generating compound to water and then forcing air into the solution. There are two basic types of foam-generating compounds, (1) a high-expansion, or synthetic type, and (2) a low expansion, or protein type. The former produces about 350 gal. of foam per gallon of solution. The protein type produces about 175 gallons of foam. It is an extra-stiff, long-lasting type of foam and is considered more satisfactory for fire-fighting work.

Two gob piles were made in the laboratory by placing unburned coal over burning coals. The piles were cone-shaped, 4 1/2 ft. in diameter and 2 1/2 ft. high. Twenty gallons of water were sprayed on one pile, while the other was sprayed with a solution of 2 qts. of high-expansion type compound and 20 gallons of water.

In both tests the temperature dropped from about 2,000°F. to 180°F. The foam did not break down readily when it touched hot coals, although some gases occasionally blew holes in the foam. Strangely, the disagreeable, suffocating odor usually accompanying a burning pile was conspicuously absent from the gases coming from the blow holes. It therefore appeared that the gas escaping from these holes was primarily steam, indicating that the foam-generating compound was either absorbing or reacting with the products of combustion and/or carbonization of the coal. If this were true, the foam would have an additional advantage.

In order to investigate this possibility, laboratory experiments were conducted by bubbling gases through foams prepared with both types of foam-generating compounds. The gases used were sulfur dioxide, hydrogen sulfide, carbon dioxide, and ammonia.

A one-inch layer of gravel was placed in a beaker, and the foam was settled over it. The gases were separately introduced through a rubber tube situated below the gravel.

The results at first indicated that the gases were being absorbed by the foam, but in standing, the foam disintegrated and all gases were released in large concentrations. It therefore appears that the foam merely prevented the break-through of the gases. But the results do not explain the absence of odor.

The foam prepared by the low expansion type compound was of finer texture and proved to be the stronger of the two.

In the field test, it was necessary to supply 60 gal. of water a minute at a pressure of about 100 lb. per sq. in. in order to generate large quantities of foam. This pressure could not be obtained at the test location, and thus the foam produced was not entirely satisfactory. It was a very wet foam, and consequently extremely fluid, slipping down the sides of the pile. As a result, an efficient seal could not be maintained for any length of time along the burning sides of the pile.

One of the benefits derived from these tests resulted in consideration of the use of foam in diminishing the glow of burning gob piles at night, thus frustrating an enemy's use of the pile as an aviation direction marker in time of war.

Dangers of Using Coal Refuse for Fill

Many operators welcome the chance to dispose of their refuse as fill material, since disposal is so often a problem. And to those who need fill, coal refuse is quite appealing because it can usually be obtained inexpensively.

But using refuse for this purpose can be both expensive and dangerous if the refuse ignites.

Take the case of a motel owner who planned to construct a restaurant on a part of his property. Coal refuse, which

had been used on numerous occasions for fill without difficulty, was piled across the highway from the motel and was to be used for fill on the restaurant site. But the fill ignited and caused considerable concern and expense, with no assurance that the fire would not break out again.

Here, in chronological order, is what happened, as reported by the School of Mineral Industries, Pennsylvania State College, which was consulted in the matter:

October 24, 1950. Owner of property presents problem to college, asking to have fire brought under control. Engineering staff agrees to help.

October 25, 1950. Staff begins investigation. Finds that refuse had been used as fill on property of coal cleaning plant. Railroad tracks and several buildings had been placed on it. Refuse from same pile was used in other locations without difficulty.

Material came from a sand flotation unit. Maximum size, 5½ in. At the site inspected, the fill extended 450 ft. along the highway, 70 ft. back, and had been dumped by truck over a 40 ft. bank. The whole surface of the pile appeared to be well compacted except for a small section where an excavation had been made for a concrete block, which supported a large sign.

At the time of this visit, smoke was coming from a section close to this concrete base. Some smoke also came from a spot about 30 ft. from the sign. It was the general opinion that the fire started because of the excavation made for the sign, and it seemed evident that the fire was drawing air from the uncompacted area around the sign and the sides of the pile.

The college staff members suggested that the sides of the pile be sealed with clay in order to choke off the fire and reduce the chances of having a fire start from some outside source. Also, that the area around the concrete block be compacted and then sealed with clay, and that no attempt be made to excavate the burning portion of the pile.

The clay for this operation was readily available from a hillside back of the motel, which was to be levelled to make room for an addition to the motel.

November 1. Cut in hillside begun. Search for hot spot starts. After some time, the hot spot was finally located about 50 ft. north of the sign and 12 to 15 ft. below the surface. Its exact depth could not be determined.

Excavating the burning portion of the pile was counter to the advice given by the college staff members, who believed this would cause the fire to be spread due to the establishment of new air currents in the excavated portion.

November 2. Excavation and compacting continued.

November 3. The hot spot was removed, for the most part, and dumped to one side on a rolled and compacted layer of clay. The operation caused considerable smoke and a tremendous odor. Much of the material consisted of glowing embers.

November 4. General appearance of pile quite bad. There seemed little doubt that the fire was spreading since there was smoking at the northern end of the pile. The experts suggested:

1. Fill excavation around hot spot with clay and compact.
2. Remove steep banks.
3. Seal sides of pile with clay.

November 7. Appearance of pile improved. The top had been levelled off and laid over with compacted clay. The seal was very good.

November 10. Work was continued at center and northern portions of the pile. This disturbance seemed unnecessary to staff members, since there had been no previous evidence of heat at the extreme northern end. Disturbance would only allow more air to enter the pile and permit the fire to spread faster. The owner was advised to level the banks and compact and seal the entire top.

December 1. Considerable rainfall in the last week of November had caused the clay to slump downward along the sides, causing large cracks. Rainwater further formed a large number of gullies in the clay.

December 29. The cracks observed December 1 had enlarged considerably. Visible flames and considerable smoke were emitted from the sides of the pile. Smoke was also coming from the top surface along a terrace which had not been sealed with clay.

The fire had spread throughout most of the pile. The owners did not plan to do anything until after the heavy spring rains. Labor and machine costs incurred by the close of 1950 amounted to $1,848.81. This figure is broken down as follows:

Bulldozers and shovel	$953.88
Roller	323.75
Cutting timber (removal of trees sticking up through the sides of the pile)	146.93
Trucking	418.25
Extra labor	6.00

In early spring the pile was still burning vigorously, with numerous visible flames issuing from the side of the pile. It was also smoking in certain areas. The clay which had been dumped along the sides has dried and cracked, and the cracks had enlarged considerably.

The clay seal held up quite well along the section of the pile where smoke was first seen coming from the sides. The owner stated that he personally supervised dumping the clay on this section. It was probably put on with a great deal more care.

The owner's worry in early spring consisted of the effects which the smoke and odor would have on his motel guests in the summer, and it was his plan to put clay all around the sides, tamping it down so it does not crack easily.

Fly Ash Seal

In four detailed investigations covered by the college staff members, a number of interesting observations were made.

For instance, one coal company which had trouble with its gob pile used a fly ash covering to control the fires. Company officials stated that a layer of fly ash one foot thick is more effective than clay two to three feet thick. The fly ash, after a rain, forms a hard layer which does not crack.

Another company investigated had a large dump, more than 25 years old, which had never fired. This pile was located on the side of a hill, and was thus protected by the hill from prevailing winds. The refuse, now dumped by truck, had been dumped by a side dump larry.

Complaints

Richard Maize, Secretary of Mines of Pennsylvania, has turned over a number of complaints to the college staff members for investigation.

One of these, from Lilly Borough, complained of a burning gob pile, close to the borough water supply. The fumes were killing the trees in the surrounding area, turning paint black on nearby houses, and forcing one family to move.

A representative of the water works stated that the company owning the pile had recently sprayed water on the pile and leveled it by bulldozing. This minimized the fume emission, and the water works was satisfied.

The pile started burning about two years ago, and while it is still smoldering, conditions have improved greatly.

Another complaint came from Donaldson, about 15 miles west of Pottsville, in the anthracite. region. Residents complained that the fumes from a burning pile, about half a mile west of the town, were injurious to their health. The pile further constituted a hazard to motoring because of the fog around it on certain days.

Both the pile and the town are in a valley which, under certain atmospheric conditions, tends to keep the products of combustion from escaping out of the valley.

The pile, started about seven years ago, is no longer being used. It is about 1,800 ft. long and 40 ft. high. It began to burn about four years ago. It is now burning at numerous places, some of the flames being two to three feet high.

While there was no evidence of fog, either by day or night, throughout the inspection period, it was felt that under proper conditions smoke and odor would affect the town as well as driving conditions. The smell near the pile was quite offensive.

Another complaint of interest came from Summerville, Pa., which stated that not only had the fumes from a nearby gob pile turned house paint brown, but it also made living conditions almost impossible.

Persons living in the vicinity of the gob pile stated that the fog and smell were particularly bad in the fall. A war veteran with a damaged lung stated that the fumes from the pile were aggravating his condition, and that he was accordingly leaving the area on advice of his physician.

The pile had been dumped about 20 years ago, and since that time no refuse had been added.

Harry Ballman took a lot of good-natured ribbing when the Ohio State Journal's cartoonist depicted him this-a-way during Cleaner Air Week. But Harry didn't mind. The cartoon called attention to the work his department was doing.

Dr. George Hill Has Narrow Escape In Wreck of Flyer

Dr. George R. Hill, chairman of the AP&SPAA Research Committee, narrowly missed death in the collision of two Union Pacific Railroad trains at Evanston, Wyo., which killed 20 and injured 49 persons.

Dr. Hill was on his way east to confer, among others, with Dr. Edward R. Weidlein, President of Mellon Institute, and W. C. L. Hemeon, Director of Engineering of Industrial Hygiene Foundation. (See Page 25).

He boarded the train at 8:50 a.m. in Salt Lake City, and went into the observation car with his brief case to do some work while en route east. The observation car was so crowded that Dr. Hill returned to his roomette, where he had the porter set up a table for him so that he could spread out his work.

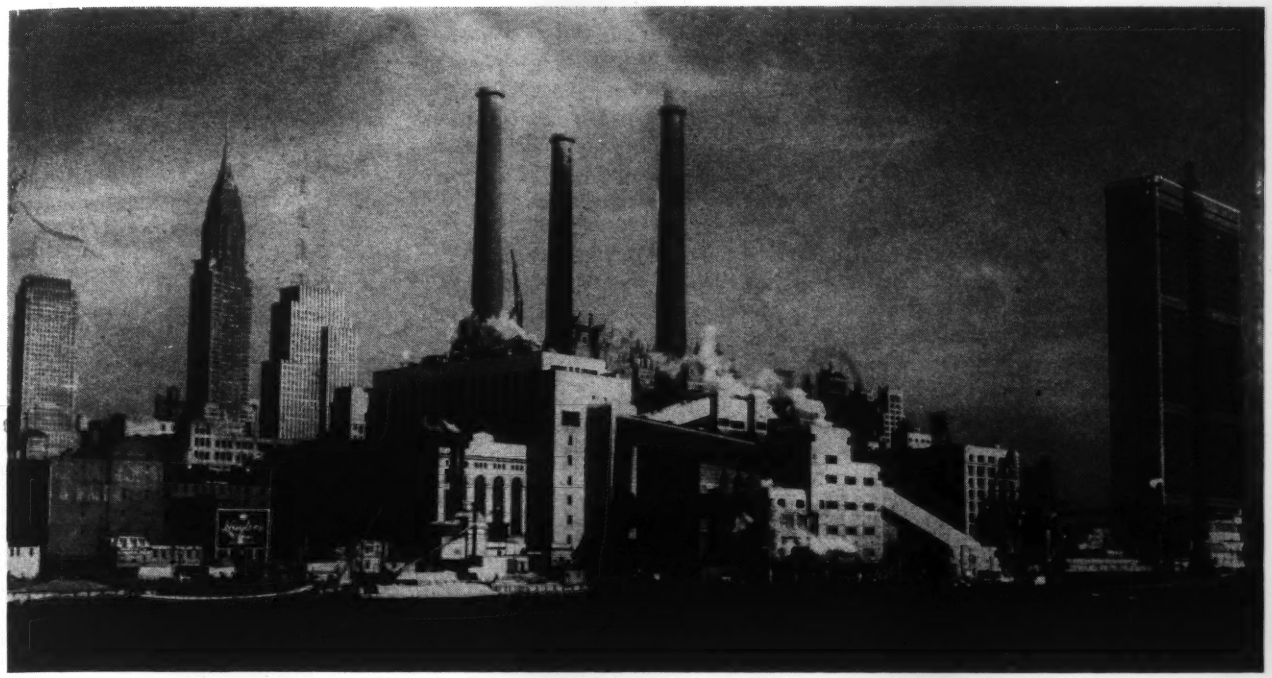
This decision saved his life, for everyone in the observation car was killed when the crash came at 11:45 — just three hours out of Salt Lake City. Everyone in the car before the observation car was hospitalized. Dr. Hill rode in the fifth car from the rear. In all, six cars were derailed. Dr. Hill's car was turned on its side.

He was wearing a light sweater, and as he tried to open the locker in which his jacket and overcoat were hanging, he could not open the door because it was sprung. So he made his way with difficulty to the outside. There was 6 to 8 inches of snowfall, and additional snow was coming down.

After some moments, Dr. Hill began to feel the cold. So he asked a porter for help, went back into the car, pried open the locker door, and put on his overcoat and hat. Both men then searched the car. Everyone was out, except one man, who, frightened from the shock, was incoherent. Dr. Hill and the porter helped get him out.

Both men were then sent to the baggage cars ahead, where all passengers were accommodated — all, that is, who were not injured. These were taken by ambulance to various nearby cities.

The baggage cars were taken to Evanston, and there the passengers changed into buses which took them east.



View of the Waterside steam electric generating station of the Consolidated Edison Company along the East River between 38th and 40th Streets in Manhattan. Permanent headquarters of the United Nations are shown at right.

THE CASE OF CON ED

Utility Finds Itself on Spot Because of Misunderstandings

When 7,000 plants, public and private, located in a single municipal area, reduced their smoke nuisance in a short 18 months, that's news!

This actually happened in New York City, from the time the present Smoke Control Board was set up in March, 1950, to last October, when this statement was made by William G. Christy, Director of the Bureau of Smoke Control.

He also said that the Department of Marine and Aviation had reduced the smoke nuisance of its ferry boats, and the Department of Sanitation is planning to spend $1,000,000 a year under a five-year program aimed at reducing incinerator smoke.

Cleaning of New York's air, however, will take a great deal of time, and some large installations will have to be remodeled at considerable cost. But a significant start was made years ago, even though some of the New York public has not been aware of it.

Utility Blamed

One firm, however, has been receiving public censure because of the manner in which it soils the air around its plants. That's the Consolidated Edison Company. Attention has been drawn toward its stack emissions through the years, and particularly since the United Nations Building was erected within a stone's throw of Con Ed's Waterside plant. The darkening of the United Nations Building's walls has been laid to the smoke issuing from the Waterside plant's stacks.

The allegations made in New York newspapers caused Con Ed considerable distress, and after some months the company resorted to paid advertisements to explain its position.

Some of the newspaper reactions, in the opinion of *Air Repair,* were ill-advised, particularly in the case of one paper which was totally unimpressed by the fact that Con Ed had already spent about $20,000,000 for new collecting devices and the modernization of older ones, and was committed to spend $4,000,000 more by 1955.

Complex Problems

What are the facts?

Con Ed furnishes a classic example of the complex problems involved in the control of air pollution, as well as in the general lack of public understanding of these problems.

Eight million persons need electricity, gas, and steam service in New York. Without them the city could not function. Con Ed supplies these services and thus furnishes a considerable number of creature comforts to the population of the second largest city in the world.

This one company alone accounts for a consumption of about a third of all the fuel used in the city. This third is equivalent to 10,000,000 tons of coal a year, made up of 7,000,000 tons of coal plus oil and natural gas equivalent to 3,000,000 tons of coal.

Con Ed is the largest user of fuel in New York. It fully recognizes its responsibility to the public, knowing it must burn this fuel in the most economical manner—not only to keep its fuel costs down, but also to give minimum annoyance to the people.

Complete Elimination Impossible

A vast improvement in the reduction of emissions from the company's stacks has been made over the past 30 years, most of it in the last 15 years. But—

The company believes that the complete elimination of all stack emissions is technically and economically impractical. Emissions can, however, be regulated to the point where they do not cause public annoyance.

This will cost money, but the company believes that the public, which consists of both customers and investors, is willing to bear the cost. In 1937 a program was set up for installing collecting devices on new boilers and for modernizing devices on older boilers. At that time it was thought that this modernization could be accomplished at the rate of $1,000,000 a year for 10 years.

War Interruption

When the program was well under way, World War II interrupted it. Then, immediately after the war, equipment was not at first available. However, the program was eventually resumed, and to date the company has spent $16,000,000—better than $1,000,000 a year even with interruptions. Similar equipment now being manufactured or installed—to go into service over the next two years—will cost $4,000,000. A third program of modernization, to cost nearly $4,000,000, will have to wait until the present materials shortage is reduced.

When people refer to "the social cost of doing business," Con Ed knows what they are talking about. Twenty-four million dollars is a very great price to pay for being a good neighbor. Much of this money, as was stated above, is going or has gone into the Waterside plant. Unfavorable attention is being drawn to it because of the effect of its emissions on the United Nations Building.

Were is the equity here? Con Ed has been on this site for nearly 50 years. The United Nations Building was only completed a little more than a year ago. And the United Nations Building is just a trifle higher than Con Ed's Waterside stacks. If the building was lower, chances for dispersion of effluent would have been excellent. To correct this condition, Con Ed may have to build additions to its stacks, and end up with a Rube Goldberg contraption which would be an eyesore to the skyline of New York. The answer is not simple.

Extension to Con Edison's East River Generating station in Manhattan, showing unusual treatment of coal silos. The work at East River is one phase of the Company's program to increase electric generating capacity. Two new 125,000 kw. units went into service there in recent months.

Stacks Watched

In spite of all precautions, the company is anxious to point out that undesirable conditions may occasionally happen. The equipment in the generating stations and the many associated controls needed are so complex that in emergencies heavy discharges of smoke may occur. These conditions, however, are quickly corrected, as the stacks are under visual observation by stack observers, whose sole duty is to watch the stacks.

Any improper stack condition is telephoned to the operators, who must investigate immediately and take steps to correct the condition. A record is kept of these emergencies and forwarded to the department manager for his personal attention.

93 Percent Reduction

The amount of fly ash and soot coming from the Con Ed stacks has been greately reduced—probably, its engineers estimate, by as much as 93 percent. Every day, on the average, somewhere between 150 and 200 tons of fine gray ash are taken from the Waterside plant alone, dumped into scows and towed to an ocean grave, since it has no local market.

With sulfur wastes Con Ed has not been so successful. To eliminate its sulfur

Ward F. Davidson
Research Engineer
Consolidated Edison Co.

fumes would cost the company about $1 per ton of coal just to run the necessary washing process, not to mention the millions it would take to set up such a process.

While the company is the largest single user of fuel in the city, it is emphatic in claiming that it is not the major source of air pollution. It further points out that even after its program is completed the reduction of city-wide air pollution will not be significant unless the other various sources of pollution are likewise reduced.

As Robert L. Heilbroner stated in an article printed in *Harper's* in January, 1951: "It is one thing for indignant housewives and civic groups (Consolidated Edison gets at least two or three complaints a week) to call for an end to smoke, and another to examine the technological perplexities which stand in the way. It is easy to point to the biggest smokestacks in the city (which are equipped with smoke control apparatus) and much more tiresome to scatter the blame over the hundreds of tugs and locomotives, thousands of apartment houses, and hundreds of thousands of private homes."

Then there is also the airborne pollution carried into New York from New Jersey by prevailing westerly winds. By the same token, Connecticut communities east of New York suffer from the pollution gratuitously sent them from Manhattan by the same winds.

Three Categories

Con Ed divides its air pollution and smoke abatement problems into three general categories: 1) furnace design and operation to eliminate smoke and reduce the quantity of dust carried with the flue gases: 2) improvement of dust separating equipment; 3) improvement in stack design directed toward better diffusion in the atmosphere.

Improvement in furnace design and operating techniques is being carried out by studies of individual units. The most interesting work in this field consists of experiments with television which, while helpful, are not the final answer to the problem. In most cases several boilers are connected to each stack, and television observation does therefore not give any intimation as to which of several boilers is not operating properly.

If the company is faced with a smoke control regulation that forbids the emission of smoke darker than some specified shade for not more than two minutes at a time, it is immediately evident that something more than a single observation of the stack is needed. To this end, Con Ed has been experimenting with a number of "light beam" type of smoke indicators. One of their shortcomings consists of being unable to indicate whether the "smoke" is black due to unburned combustible materials, or whether it is merely dense due to high fly ash content.

The second problem — improving the efficiency of cinder and fly ash collectors —has been under study ever since Con Ed began to use devices of this kind.

"The design of such equipment." stated Ward F. Davidson, Research Engineer of Con Ed, "is much more an art than a sound technology. As a result, scarcely an installation is made that does not require a considerable period of cut-and-try adjustment to bring the collector efficiency to a value approximating the manufacturer's prediction.

"For several years we have been buying equipment warranted to operate at 95 per cent efficiency or better, but in most cases extensive modifications were necessary before we can bring the equipment to approach the claims.

"Since most of our installations use pulverized coal or oil, our interest has leaned toward the precipitator type of collector, rather than toward the mechanical type. Yet we have done some work with mechanical collectors, principally for installation in connection with our water gas sets. This is still rather in the early stages of development."

Stack Design Important

The third field of activity—stack design—is comparatively new. Its importance is emphasized by two factors: 1) it is technically and economically impossible to remove all dust and objectionable gases from the stack effluent; 2) by appropriate stack design, the objectionable effects of these pollutants can be considerably reduced.

A paper on this subject, delivered at the Roanoke meeting of APCSPAA by Mr. Davidson, covered the details quite fully. It is being printed in the Proceedings, which should be in the hands of the members at a very early date.

He pointed out that for some situations appropriate stack design is capable of reducing the concentration of pollutants at the ground (or living) level by a factor of as much as 10. This is as great an improvement as one would get by increasing precipitation efficiency from 90 to 99 percent. Since these two approaches are not mutually exclusive, their use together may improve the situation by a factor of as much as 100.

Company Defends Itself

In a lengthly statement, published when the newspapers were particularly anxious for "results," even attacking the administration of William G. Christy, Director of New York's Bureau of Smoke Control, Con Ed has the following to say for itself:

1. Con Ed is on the side of effective control of smoke. Its own engineering staff, with the occasional help of consulting engineers, has worked on its smoke control problems since 1901.
2. The company has made cash donations and lent technical talent to groups working for smoke control.
3. Con Ed's contribution to total air pollution is insignificant. "By plotting locations of our plants in relation to sampling points, and by recording wind direction and velocities, we found that *even if our plants were shut down* there would be no measureable improvement in total air pollution unless other sources were effectively controlled."
4. Con Ed tells its story fully and frankly to anyone interested. It accepts invitations to civic groups. It follows up every complaint. It has called its stand repeatedly to the at-

tention of New York newspapers, in interviews as well as in paid advertisements. Yet during the unfavorable publicity period last summer and fall not a single New York newspaper reporter has accepted Con Ed's constantly repeated invitations to come and *see* what has been done.

5. Con Ed welcomes an independent, non-political survey of air pollution, its causes and sources. It spent $50,000 of its own money on an air pollution survey 12 years ago. Since conditions have changed, the company recommends that a new survey be made at the present time.
6. Con Ed keeps after both smoke and fly ash. Smoke is technically incompletely burned fuel. Fly ash is the unburnable portion of the fuel. Con Ed's operators are well trained to get the most heat out of the fuel. Fly ash must be handled by equipment specially designed for the purpose. Con Ed is among the leaders in the development, installation, and operation of such equipment.
7. Sulfur dioxide and other gases discharged from Con Ed's chimneys do not form a measurable part of the air pollution at street or building level because the point of discharge—many hundreds of feet in the air—affords ample opportunity for dilution and dispersal.

Sound Arguments

These arguments have a great deal of sense to them, and they should go a long way, if properly exploited, to clear the New York atmosphere of hysteria where Con Ed is concerned.

The company, of course, also recognizes there are certain things which work against it, and that only time and education can improve the present situation. For instance, since Con Ed's stacks are the largest in the city, both in cross section and in height, any emissions from them look darker and stand out above smoke from another source.

The general public does not know the difference between smoke and vapor, and thus often accuses Con Ed of a violation when such is actually not the case. Furthermore, the company's own control program is not as far along as it should be. This is due to the unprecedented increase in load, which made it impossible to retire certain equipment as previously scheduled. The effects of the delay caused by World War II are still being felt.

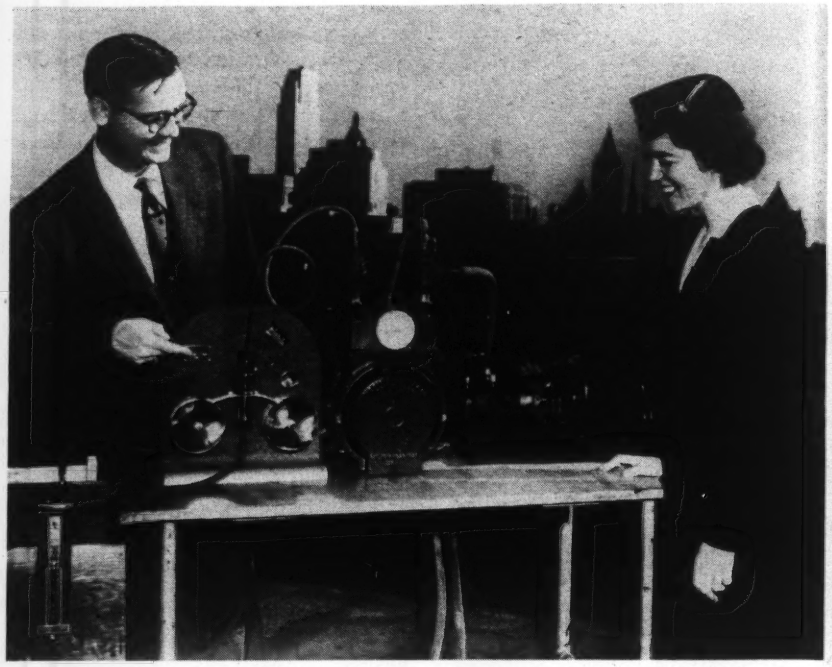
When people want utilities, they want them right away, and the company that can't fit immediate service into its modernization procedure is roundly denounced. In such rough weather, staying on an even keel is somewhat of an art, and a utility should not be blamed if it has not always mastered this art or if, due to circumstances, it cannot.

Square Shooting

Con Ed also freely admits that not all the equipment presently installed is operating as well as had been expected. First models of new products often have "bugs" that must be engineered out by a process of trial and error.

Since it is necessary to keep equipment in service during revamping of smoke control apparatus, and since changing load characteristics necessitate changes in plans even as they are being executed, the process of modernizing the company's smoke control equipment is difficult and expensive and takes a considerable amount of time.

CINCINNATI ANNOUNCES NEW AIR POLLUTION CONTROL PROGRAM

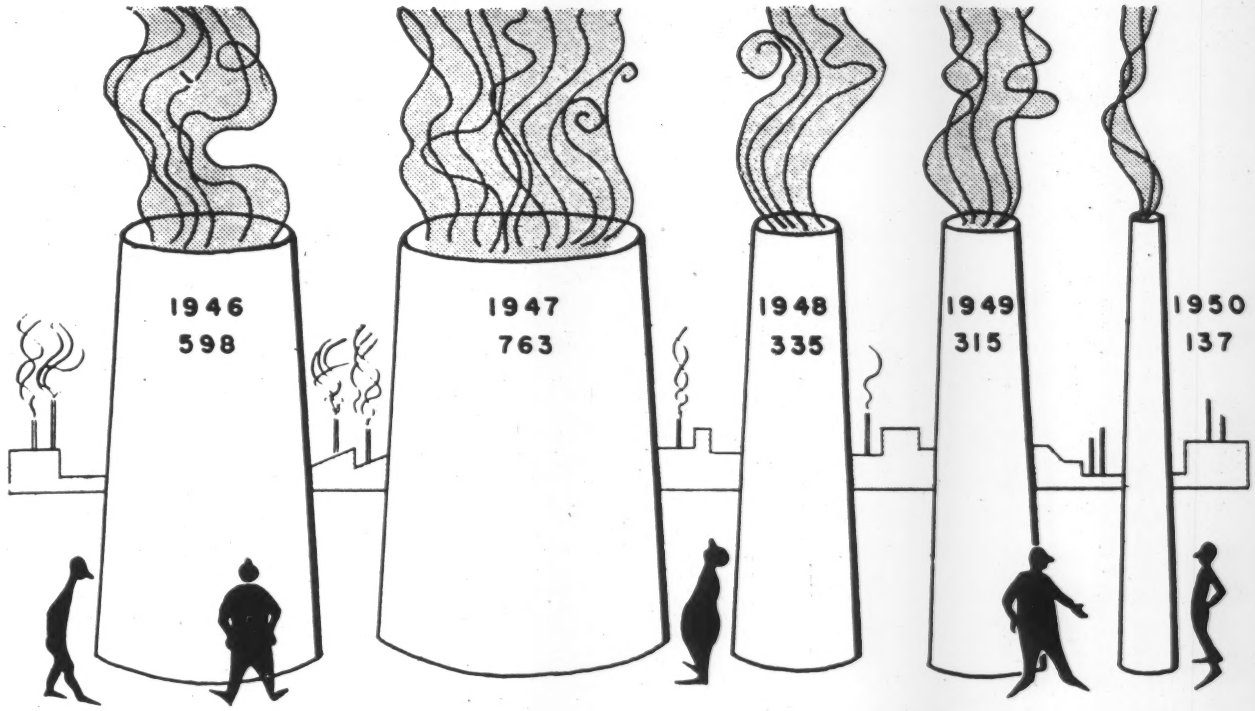


Miss Clean Air of Cincinnati, known to her friends as Marie Whalen, American Airlines hostess, watches E. L. Alpaugh, chemical engineer of the Cincinnati Bureau of Smoke Inspection, as he shows how the city's new air pollution testing equipment continuously samples the air above Cincinnati. This picture, taken atop the Smoke Inspection office building at 417 Lincoln Park Drive, clearly indicates the visibility and cleanliness of the Cincinnati skyline.

Miss Marie Whalen, American Airlines hostess who was chosen Miss Clean Air of Cincinnati during Cleaner Air Week last October, witnessed a demonstration of air pollution testing equipment by Charles W. Gruber, Chief Smoke Inspector of the City of Cincinnati, and E. L. Alpaugh, chemical engineer, Bureau of Smoke Inspection.

The equipment, set up on the roof of the City Bureau of Smoke Inspection building, is a newly developed continuous air sampler coupled with a photoelectric shade meter or dirtmeter, which indicates if Cincinnati air contains more dirt in the daytime or at night; on a week-end or on a workday; on a cold day or on a warm day; on a calm day or on a windy day; in the Eastern Hills or the Western Hills.

In the very near future the Bureau's activities will be expanded into the related fields of odors, fumes, and other types of air contaminants. The Bureau's ultimate goal is to achieve as successful a record in this type of air pollution control as achieved in the control of city smoke.



Observed Industrial Smoke Violations. The Marked Decrease is an Important Factor in Cleaner Atmosphere.

In Cincinnati's Enforcement Policy

FACTS ARE FIRST

by CHARLES W. GRUBER
Chief Smoke Inspector
Cincinnati

An NTA (Notice To Appear) was entered on the Chief Smoke Inspector's calendar, and a white copy of a Smoke Warning Tag was laid on the desk, attached to the file of the ABC Building.

The Notice To Appear was issued on Jan. 11, 1951, to John Doe, Purchasing Agent, as representative of the ABC Building's management. On the reverse side of the office copy of the tag, the following notation was made by the smoke inspector:

> 11-F/M Htg-Stkr
> Firemen have to do janitor duty in addition to firing. Have two men who do this work. On entering plant, no one was in boiler room. Stoker out of adjustment and blacking out neighborhood. Have warned operator and management on numerous occasions and can get no cooperation. Have exhausted all means of trying to clean this up.
>
> JG
> 1-11-51

The abbreviations at the head of the notation mean: 11: Cause No. 11. Firemen doing other work. F/M: firemen and management responsible. Htg-Stkr: Heating plant, stoker fired.

The foregoing is an example of Step 2 in the Cincinnati Bureau of Smoke Inspection's Policy of Enforcement dealwith one phase of the Clean Air Ordinance, namely, the visible smoke violators.

Step 1 of the Policy of Enforcement against this plant was taken Jan. 2, 1951, when Inspector JG was in the plant at 10:10 a.m., following an observed violation. On this date a Smoke Warning Tag was issued, and recommendations for correction were made by the inspector. As required by the Policy of Enforcement for a first violation notice within a four-month period, a written report of action taken by the management was returned to the Bureau of Smoke Inspection by the purchasing agent. In the case of the ABC Building, is was not necessary to proceed with Step 3, which is prosecution in court. The results of the office conference following the Notice to Appear produced the desired results—a clean stack.

Thirteen-Year Study

The Policy of Enforcement has been developed from an intensive study of smoke violations, their cause and correction, since 1938. From this study, the tremendous amount of accurate, complete, and up-to-the-minute records was brought out, and led to the establishment of the step-by-step procedure *built around a complete District Smoke Record which each inspector carries with him in the*

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field. In other words, on-the-spot action is taken, based on the true factual record of what has happened, in accordance with a pre-set policy.

The procedure is operated on a four-month time cycle. By restricting the time cycle, and by assigning inspectors to districts, the total number of plants and the number of active (smoking) plants per inspector is limited. Thus, complete and orderly coverage is obtained.

Each district has an average of 850 plants. A team of two inspectors is assigned to each district, and they in turn subdivide the district for regular inspection responsibility. However, when one inspector is off duty, the other man moves in and temporarily carries the entire district. Thus coverage is properly maintained with a man who is familiar with the district.

Changes in inspector assignment are infrequent, as familiarity with plant operation and management is a valuable asset in dealing with smoke violations or other situations. Inspection of new equipment and annual inspection—which is made by the district inspectors—is also valuable in keeping the inspector posted on changes which occur, and the general conditions of plants in his district.

The four-month cycle was an arbitrary one, and can be changed by administrative action if necessary or desirable. Plants are seen at least once every three days, and many are observed every day that the inspector is on the job.

Time of observation is varied, *and includes Saturdays, Sundays, and holidays, with stress on early morning hours.* After dark spot checks are made, primarily for psychological reasons. Thus it was felt that a plant which survives the watchful eye of an inspector for four months without causing a smoke violation is basically a good plant, and should not be subject to penalty on the first violation.

Three Steps

Step 1 is taken on a first violation in a four-month period, and requires that management file with the Bureau of Smoke Inspection a signed, written acknowledgement of the violation with a statement of action taken to correct the cause.

If the smoke violation is repeated within the four-month period, it is evidence that management was not sincere in carrying out its written agreement. So a Notice To Appear (Step 2) for a conference in the offices of the Bureau of Smoke Inspection is issued. If a smoke violation is observed after the completion of the corrective program established at the office conference, then Step 3—prosecution in Police Court—is instituted. This may vary by having Injunction Proceedings taken.

In order to assemble a complete and usable record without increasing the office staff, every inch of red tape had to be cut in getting the individual smoke violation from the field, into the office record, and back into the field again.

The operation of the system is geared to two forms: the Smoke Warning Tag, and the District Smoke Record. The District Smoke Record will be described first, as it dictates the form of the Smoke Warning Tag. The minimum information needed on each smoke violation is as follows:

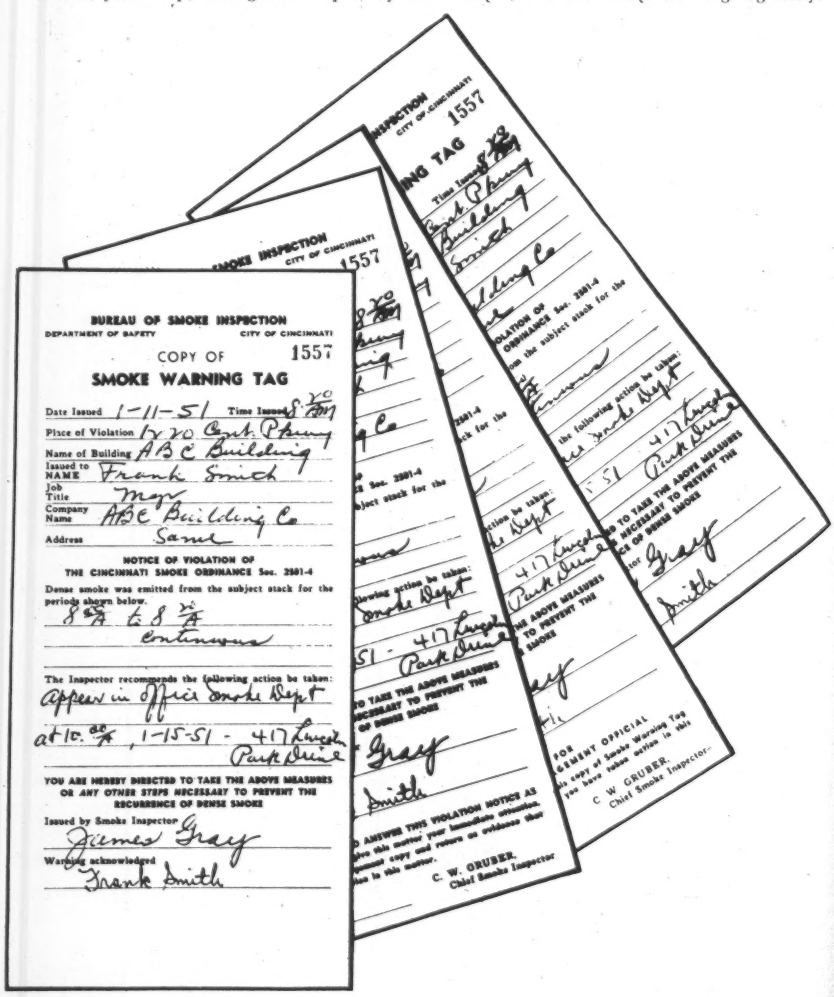
- date of violation
- location of plant
- name of plant
- name of fireman
- name of responsible management official
- duration of violation in minutes
- assessment of the responsiblity, whether firemen or management
- the cause of violation
- the plant record (a year's record is carried)
- type of action taken
- plant equipment as to boiler and firing device (the firing device indicates the type of fuel)
- the inspector's initials

Yes! All this is typed on one line of a standard notebook size paper! Violations are posted to the District Record each week. The January and February sheet for District 1 is shown in Fig. 1.

Code Language

It was obvious that a code language had to be developed. The first step was

Smoke Warning Tag. Each consists of four notices which are, left to right, office record, follow up, management report of action taken, and the smoke warning tag itself.



BUREAU OF SMOKE INSPECTION
DEPARTMENT OF SAFETY — CITY OF CINCINNATI

COPY OF 1557

SMOKE WARNING TAG

Date Issued 1-11-51 Time Issued 8 XO
Place of Violation Cent. Pkwy
Name of Building ABC Building
Issued to NAME Frank Smith
Job Title Mgr.
Company Name ABC Building Co.
Address Same

NOTICE OF VIOLATION OF THE CINCINNATI SMOKE ORDINANCE Sec. 2501-4

Dense smoke was emitted from the subject stack for the periods shown below.
8 A to 8 XO A
Continuous

The Inspector recommends the following action be taken:
Appear in Office Smoke Dept
at 10. A.M. 1-15-51 - 417 Lynch Park Drive

YOU ARE HEREBY DIRECTED TO TAKE THE ABOVE MEASURES OR ANY OTHER STEPS NECESSARY TO PREVENT THE RECURRENCE OF DENSE SMOKE

Issued by Smoke Inspector James Gray
Warning acknowledged Frank Smith

Fig. 1

A-1 DISTRICT

JANUARY 1951

(Check Back to Same Day in September 1950)

DATE	LOCATION	PLANT NAME	FIREMAN	MANAGEMENT						
1- 2-51	1403 Central Pkwy.	Sicking Co.	J. Murray	W. Cann	4	F	5	RB	1-0	H-S JRA
1- 2-51	1228 Central Pkwy.	College of Music	L. Preswood		21	FM	3	RB	1-1	H-S JG
1- 4-51	435 E. Fifth St.	The Fontbonne	P. Seiter	P. Seiter	8	FM	1	RB	1-0	H-S JRA
1- 9-51	417 Sycamore St.	Federal Garage	C. Vail		9	F	3	RB	1-0	H-OB JRA
1-10-51	402 E. Fourth St.	W & S Life Ins. Co.	B. Norris		14	FM	3	RB	1-0	H-S JRA
1-10-51	918 Race St.	Campbell Assoc.	A. Rinz	D. Campbell	9	FM	5	RB	1-0	H-S JG
1-11-51	1228 Central Pkwy.	College of Music	E. Smith		20	FM	5	NTA	2-1	H-S JG
1-11-51	4th & Broadway	Broadway Hotel	C. Webster	J. Adrion	2¾	F	1	RB	1-0	H-S JRA
1-15-51	124 Broadway	Benjamin Hey Co.	M. Barbara		4½	FM	3	RB	1-1	Pr-S JRA
1-15-51	609 College St.	Max Wocher & Son	W. Brown		5	F	3	RB	1-0	H-S JRA
1-22-51	814-36 Walnut St.	Y.W.C.A.	H. Duty		4	F	1	RB	1-0	P-S JG
1-22-51	105 E. Third St.	United Bank Bldg.	C. Harris		10	FM	62	RB	1-1	H-S JRA
1-31-51	1403 Central Pkwy.	Sicking Co.	J. Murray	W. Cann	6	F	1	NTA	2-0	H-S JG

Expires June 1, 1951

FEBRUARY 1951

(Check Back to Same Day in October 1950)

2- 5-51	618 Lock St.	Diem & Wing	P. Cromwell	P. Lonrull	5	F	3	RB	1-0	P-S JRA
2- 6-51	121 E. Third St.	Town Garage	P. Van Oflen		5	F	3	RB	1-0	H-S JRA
2-28-51	314-20 Elm St.	Fair Store Whse.	C. Smith		8	FM	3	RB	1-0	H-S JRA

Expires July 1, 1951

the codification of standard causes of smoke. This is shown in Fig. 2. It is noted there are four main breakdowns: Improper Operation; Improper Fuel; Improper Equipment; and Miscellaneous. This is the lazy man's way of writing lots of words, and as you can see, the Cincinnati Bureau of Smoke Inspection is committed to the principle of "least writing" to get information down on paper. This pays off, as at the end of the month and the year causes of smoke can be grouped and their efforts toward correction can be pinpointed to the target which is most vulnerable. Such record of causes has been carried in the Bureau of Smoke Inspection Annual Reports since 1940. Fig. 3 shows the shift in causes since that time. Other items of the District Record which are not obvious are indicated in Fig. 4.

The companion piece to the District Smoke Record, the Smoke Warning Tag, is a book of tags carried by the inspector. Each notice is a set of four. The original is the office record. The second is for follow up, the third is for management report of action taken, and the fourth is the Smoke Warning Tag.

If the management report of action taken fails to show up after a reasonable interval, the follow-up copy is sent out by mail. It contains the following punchline in red ink:

YOU HAVE FAILED TO ANSWER THIS VIOLATION NOTICE AS REQUESTED. Please give this matter your immediate attention. Complete the management copy and return as evidence that you have taken action in this matter.

Determine Cause

In a plant inspection following the violation, the inspector must determine, from the facts at hand, the *major cause* of the violation. He may assess as many minor or contributing causes as he feels are pertinent, but he must decide on one major cause.

The minor causes are tabulated, but are carried to the District Smoke Record. Each week the smoke violations are entered by the office on a master ditto

Fig. 2

CODE OF CAUSES OF SMOKE VIOLATION

IMPROPER OPERATION

1. Rodding Fire (S)
2. Firing thru F.D. by Hand (S)
3. Air-Fuel ratio out of adjustment (S)
4. Not using Steam Air Jets (H)
5. Careless Firing (S&H)
6. Starting fire in cold boiler (H&S)
7. Cleaning fire (H&S)
8. Banking fire (H&S)
9. Burning trash (H&S)
10. No one assigned to firing job (H&S)
11. Fireman doing other work
12. Regular fireman off—relief man firing

IMPROPER EQUIPMENT

30. Emergency breakdown or Service (S)
31. Stoker setting too low (S)
32. Overfire air needed (S)
33. No steam air jets or other approved devices (H-HP)
34. Steam air jets not effective (H)
35. Equipment dirty-plugged with soot and fly ash (H&S)
36. Equipment in general state of disrepair (H&S)
37. Equipment too small or improper design (H&S)
38. Insufficient Draft (H&S)
39. No smoke indicator
40. Smoke Indicator not effective
41. Equipment not suitable for fuel.
42. Pulverizer failure or outage

IMPROPER FUEL

60. Using HV coal w/o proper equipment (H)
61. Fuel too large—not enough slack (S)
62. Fuel too small—too much slack (S)
63. Change from LV to HV because of strike or supply
64. Change in size or quality because of strike or supply
65. Bad load of coal—general
66. Wood fuel

MISCELLANEOUS

90. Unable to determine cause (H&S)
91. Questionnaire
92. Junk fire
93. Insufficient temperature in combustion chamber
94. Wet fuel
95. Incinerator
96. Accidental

Fig. 3

CAUSES OF SMOKE VIOLATION

	1950	1949	1948	1947	1946
Improper Operation	93	231	272	351	307
Deficient Equipment	22	31	20	84	45
Improper Fuel	9	19	29	124	125
Emergency Breakdown	0	0	0	29	51
Junk fires, miscellaneous, indeterminate	13	34	13	176	70
TOTALS	137	315	335	763	598

NUMBER OF SMOKE OBSERVATIONS MADE BY B.S.I.

	1950	1949	1948	1947	1946
Number of Observations ...	75,730	50,341	46,607	60,607	69,090

sheet. The new sheets are run off and distributed to the district inspector, and the previous sheets are then discarded. Thus the District Smoke Record is kept up to date.

The Office Conference

At the office conference, the district inspector, supervising smoke inspector, and the chief smoke inspector are present. The alleged violator to appear may be the fireman, the chief engineer, the building manager or company president, depending upon who is primarily responsible for the corrective action.

In many cases the alleged offender brings with him technical representatives or fuel men for the discussions. In only one case has there been legal counsel present for the accused.

Every attempt is made to generate a cooperative atmosphere about the conference. It is not the policy of the Bureau of Smoke Inspection to argue or force recommendations upon the plant management. The position is frankly stated that the correction is up to the violator, and that recommendations are made for his benefit.

If he does not wish to accept them, there is no objection. If a question of final responsibility is questioned, then it is frankly stated that should the recommendations of the Bureau of Smoke Inspection not produce results, other means must be taken.

As experienced smoke enforcement officials know, in such round table discussions the "ball" is usually tossed back and forth with such remarks as:

"You tell me what to do, and I will do it. But if I do it, will it work?"

The reply is something like this:

"What has been recommended constitutes the best experience of the Department for correction of the type of trouble. If it does not work, you will have to try something else."

Demand Time Commitments

An important point in establishing the corrective program is the matter of time. In other words, vague commitments as to time of compliance are avoided at all costs. It has been found from experience that such promises as "I'll do something as soon as possible," or "in the near future," or "we are taking bids," are evasive and for the most part meaningless.

The exact time of accomplishment must be established.

If the violator states it will require 10 days for compliance, he is usually given two weeks. If he says it will require a month for completion, the time for check-back is usually set for six weeks. In other words, an added time allowance is given, indicating the cooperative spirit of the Bureau of Smoke Inspection.

Fig. 4

CODE ON SMOKE VIOLATIONS

ACTION

RB — Report Back
NTA — Notice to Appear

RECORD

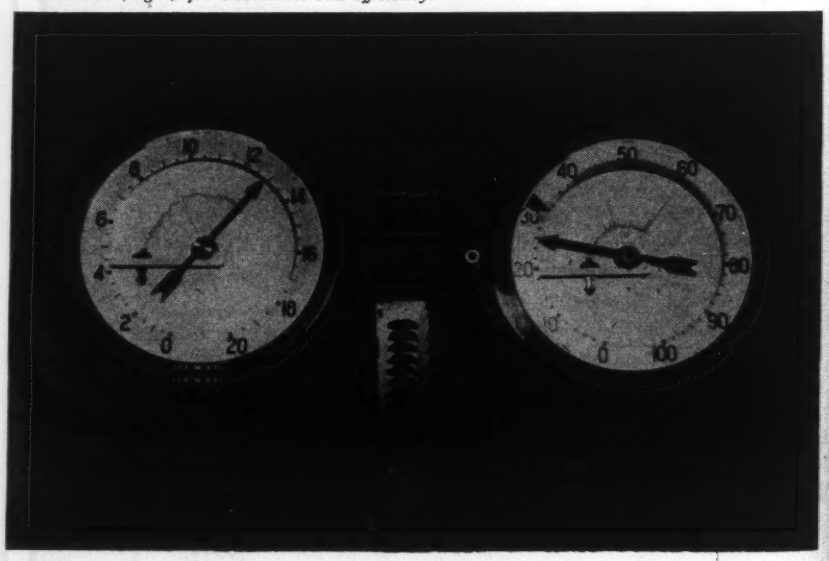
1st figure — Number of violations during the preceding 4 months, including the recorded violation.
2nd figure — Number of violations in the preceding 8 months. The sum of the 2 figures indicates the number of violations recorded in the past 12 months, including the current violation.

EQUIPMENT

Pr — Power or Process
H — Heating
WAF — Warm air furnace
HWH — Hot Water Heater
S — Stoker
HF — Hand-fired
OB — Oil Burner
FP — Powdered Fuel
W — Wood

Observed smoke violations have dropped off 77 percent in 1950 from 1946. (Page 13). Since 1948, when the Three-Step Policy was adopted, more than 75 office conferences have been held, and in only one case was it necessary to institute Step 3: prosecution in court.

Boiler plant twin speedometer CO_2 recorder (left) for efficiency, smoke density recorder and alarm (right) for cleanliness and efficiency.



WHALEN PRESENTATION CEREMONY—Left to right: U. F. Tihen, Master Mechanic, Missouri Pacific Railroad, St. Louis; J. H. Carter, St. Louis Smoke Commissioner with the APCSPAA certificate; E. J. Buckbee, retired Master Mechanic, New York Central Railroad, Mattoon, Illinois; Mr. Whalen; O. A. Gerber, retired Chief Mechanical Officer, Missouri Pacific Railroad, St. Louis; and H. J. Riddle, retired Road Foreman of Engines, Pennsylvania Railroad, Terre Haute, Indiana.

Honorary Membership Given to Joe Whalen At St. Louis Meeting

Joseph M. Whalen, retired master mechanic of the Missouri Pacific Railroad, was awarded an honorary membership in the Air Pollution & Smoke Prevention Association of America.

This was done in recognition of the many great services he performed in the interests of air pollution abatement over a long period of time.

The presentation was made in the office of James H. Carter, Commissioner of Smoke Regulation, St. Louis. The ceremony was attended by old friends and associates, some of whom came from as far away as Chicago, Indianapolis, and Terre Haute, as well as from points closer to St. Louis.

The 78-year-old guest listened with interest to Mr. Carter's presentation speech, and to the addresses made by O. A. Garber, retired Chief Mechanical Officer of the Missouri Pacific, St. Louis; U. F. Tihen, who succeeded Mr. Whalen as master mechanic at St. Louis; E. J. Buckbee, retired master mechanic of the New York Central Railroad at Mattoon, Ill.; H. J. Riddle, retired road foreman of engines, Pennsylvania Railroad, Terre Haute; H. G. Fuller, Road Foreman of Engines, Pennsylvania Railroad, Indianapolis; E. W. Erisman, General Foreman of Engines and Superintendent of Air Brakes, Wabash Railroad, Decatur, Ill.; John Daley, Superintendent of Motive Power, Alton & Southern Railroad, East St. Louis; E. O. Bergman, Road Foreman of Engines, Wabash Railroad, Decatur.

The award, in the form of an attractive framed certificate, signed by President John L. Hodges and Executive Secretary Robert T. Griebling, came as a complete surprise to Mr. Whalen, who was merely told that the regular monthly railroad meeting would have quite a few old-timers on hand, and for him to be sure to attend.

Mr. Whalen had a most interesting railroad career. As a native of Reading, Pa., he left school when only 14 years old to go to work as a machinist's apprentice on the Philadelphia & Reading.

His itching feet wouldn't let him stay in one spot too long, however—and so he served in 16 locations, two of them in Mexico, before he finally settled down in St. Louis in 1926. He had numerous positions with various railroads. At 22 he was an engineer and at 24 general foreman. He had been master mechanic since 1913. Mr. Whalen retired from active service on June 30, 1946.

The 20 years Mr. Whalen spent in St. Louis before retirement were devoted to smoke prevention, both locally and through the national association.

One of the guests at the presentation brought along a mimeographed copy of the minutes of the first meeting of the railroad section of the Smoke Abatement Committee of St. Louis. That meeting was held on Sept. 15, 1926, and of those who attended the Whalen award, two were present at the 1926 meeting. They included Mr. Whalen himself and Charles P. Foster, then a Missouri Pacific engineer, now Missouri Pacific Superintendent of Fuel Conservation.

W. J. Ficke, General Foreman of the Frisco Railroad, who was present at the 1926 meeting, and who is one of the railroad committee's most loyal and active members, could not be in Mr. Carter's office when the award was made.

J. Steiger, a Missouri Pacific fireman, was also present at the 1926 meeting. His son Joe, now a Road Foreman of Engines for the same railroad, is a regular attendant at the railroad committee meetings, and was present when Mr. Whalen received the award.

Many Important Studies Made By John F. Barkley

The oldest honorary member of our Association in point of time, and the youngest in point of years, is John F. Barkley, Chief of the Fuels Utilization Branch, Fuels and Explosives Division, Bureau of Mines, Washington. He was elected to honorary membership at the Milwaukee meeting in 1939, and has served with distinction on many occasions. The "outline" of his work takes up three pages of single-spaced typing, and we bring you excerpts from it herewith, since you should know such an interesting and talented member.

John Barkley was born in Chanute, Kas., and educated at the University of Kansas and the Michigan School of Mines. Upon graduation from the Michigan school in 1910, he taught mechanical engineering subjects at the New Mexico School of Mines, and, a year later, became a research assistant, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

But electrical engineering did not interest him greatly, and so he transferred to the fuels section of the Bureau of Mines in Pittsburgh in 1913. There he did research work on combustion, instruments for recording carbon dioxide, and heat transmission, including the measuring of temperatures of gases in boiler settings and the radiation error involved.

Steel Engineer

Four years later Mr. Barkley accepted a position as special engineer of the Carnegie Steel Company at Braddock, Pa., where he was engaged on many special problems concerning plant betterment, including the study of operation of gas producers which resulted in a steel corporation efficiency record at that time. He also did research on the production and flow of blast furnace gas.

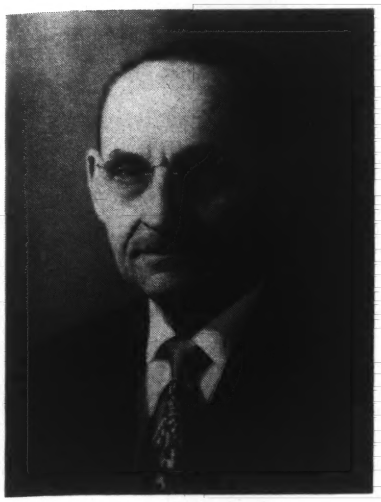
While this work was most interesting, Mr. Barkley yearned to resume his work in the Bureau of Mines, and in 1923 he was made supervising engineer in the fuel economy service section at Washington.

And there he's been ever since, becoming chief of the Fuels Utility Branch five years ago. Here are just a few of the things Mr. Barkley accomplished during his long stay with the Bureau of Mines:

He was consulted on fuels, their utilization and purchase, on the design and operation of fuel-burning equipment and general boiler plant work, including the chemical conditioning of boiler water.

Mr. Barkley also served as a consultant to various municipalities and industry on smoke and fly ash abatement. He installed and studied forced-draft spreader stokers—a study which was followed by their wide use in industry. He established a uniform system of boiler feed-water conditioning, now successfully used in more than 2,000 federal institutions, and also did research on caustic brittlement, boiler water scales and sludges, and the prevention of corrosion in condensate return lines.

Walter E. Sample, retiring from the Baltimore & Ohio Railroad after 53 years of loyal and efficient service, was honored with a testimonial dinner in Pittsburgh on October 31, at which he was presented with an honorary membership in the AP&SPAA. Presentation was made by Prof. Sumner B. Ely, Director of Pittsburgh's Bureau of Smoke Prevention and twice president of the old Smoke Prevention Association, in the presence of 150 associates and guests. Mr. Sample also received the television set at which he is standing with Mrs. Sample. Guests at the speaker's table included Thomas C. Wurts, Director of Allegheny County's Bureau of Smoke Control, M. G. Stewart, of the Washington Terminal, and Robert T. Griebling, Executive Secretary of AP&SPAA.



John F. Barkley

Mr. Barkley established economies in the federal government which saved millions of dollars, and for which he received an Award of Merit from the Department of the Interior.

War Work

From 1942 to 1946 Mr. Barkley rendered a consulting service to government agencies controlling the allotment of fuel to industry and to the general public. He made surveys in connection with the storage of coal, and did research on the use of coal-in-oil (colloidal) fuels which provided required factual data concerning their use.

After the war the Fuels Utilization Branch resumed its peacetime role, Mr. Barkley was made chairman of several committees whose work resulted in the establishment of new federal procedures for the specifying and purchase of federal coal; research on the use of additives to fuel oil. For about a year Mr. Barkley, under Presidential order, issued approvals or disapprovals for the installation of all new federal fuel-burning equipment using oil or gas.

Engineering Advanced

Mr. Barkley made many contributions to the advancement of the science of engineering in his lifetime. He helped give new basic information on heat transfer through boiler tubes and the radiation error in measuring the temperature of gases.

Methods for improving fuel-burning equipment and new information developed in federal plant betterment were passed on to industry. All fuels were included. New information on sampling coal for moisture was determined, as well as best firing techniques for various types of fuel-burning equipment. At the time of the commercial infancy of the forced-draft spreader stoker, the information developed in the government and its immediate installation in many federal plants was soon followed by wide acceptance in industry.

Mr. Barkley served as chairman of the Fuels Division Model Smoke Law Committee of the American Society of Mechanical Engineers. After studying smoke and fly ash problems for seven years, the committee issued the now so well-known "Example Sections for a Smoke Regulation Ordinance."

These sections have been studied and used as a basis for ordinances by more than 100 cities in making changes in adopting new smoke ordinances. The example sections were further approved by the Stoker Manufacturers Association, and formed the basis of the recommended smoke ordinance of the Coal Producers Committee for Smoke Abatement and that of the Coal Trade Association of Indiana.

Handbooks

In addition to publications resulting from research work, a number of educational publications of the less technical type, such as a series of question-and-answer handbooks on fuel use and boiler feed-water conditioning, were prepared. These publications have been used by the government, industry, and the general public in the hundreds of thousands.

Technical literature on plant operation —with a slant toward the conservation of fuel—was distributed during the war throughout the United States, and requests for this literature continue to come to the Bureau of Mines. New information, some of which is yet to be published, was determined on coal storage, which became so important during the war. And the paper which Mr. Barkley published on this subject for immediate use during war-time was requested by thousands.

Other Studies

The standard methods developed for treating boiler feed water for plants up to about 250-lb. pressure and the standard test kits devised are used throughout the federal government and have had appreciable effect on such practices in the smaller industrial plants. The federal use of amines for preventing condensate return-line corrosion, together with the laboratory research information later developed, is being widely followed and adopted by industry.

The studies of the action of sulfur in the burning of fuel, together with other minor components, have produced new information. The solution of the difficulty of bonded deposits on tubes beyond the boiler surface in the boiler plant of the Washington Naval Gun Factory has led to a much better understanding of this phenomenon and how to prevent it. Further information on the corrosion and the action of bonded deposits on air preheater equipment has improved air preheater operation in many plants in the United States. The results of these investigations are soon to be published.

CORRECTION

The proposed incinerator code, reproduced on Pages 24 and 25 of the November issue, was not the one prepared by the Incinerator Institute. The latter is not quite ready for publication—it is still under study.

Mr. Barkley has written more than 50 papers on air pollution problems, the latest of which, "Air Pollution Prevention in the United States," was distributed to members of the Association last spring. Mr. Barkley is a member of several technical societies, and last year was awarded the grade of Fellow in the American Society of Mechanical Engineers.

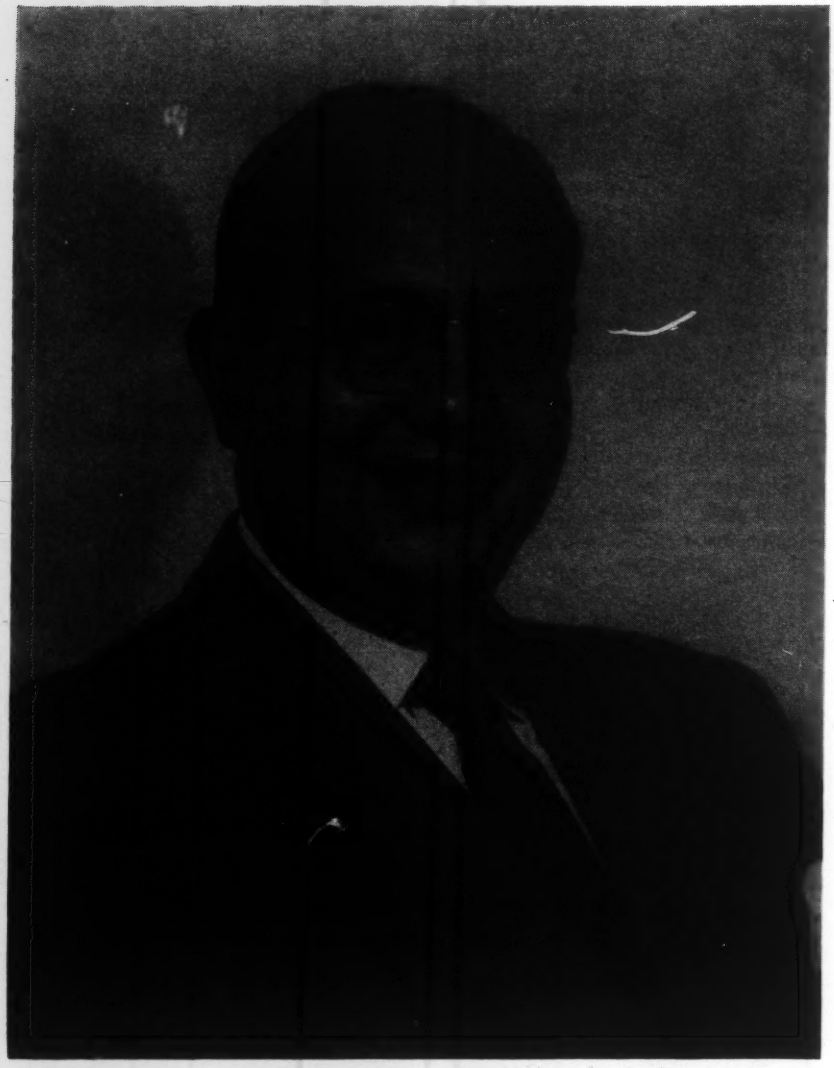
It is indeed a privilege to have this brilliant scientist in our midst!

Technical Conference Postponed

The meeting of the Technical Conference Committee, set for February, has been scheduled for a date in April, according to Dr. Hamnett P. Munger, chairman.

The change was decided upon since the original date would conflict with the meeting of the East Central Section in Akron. This meeting will be held on Thursday and Friday, Feb. 7 and 8, in the Mayflower Hotel, Akron, Ohio.

Those who wish to attend should notify L. E. Bunts, Municipal Bldg., Akron, Ohio.



Dr. A. M. Zarem, the author of this paper, is Director of the Los Angeles Division of the Stanford Research Institute. His job consists of studying major problems facing the future development of the Los Angeles region, including mass transportation, water resources, and air pollution.

In 1944 the California Institute of Technology awarded Dr. Zarem a doctorate magna cum laude for advanced studies in electrical engineering, physics and mathematics.

He attained international reputation with the development of a novel camera for the United States Navy. This camera can take pictures at the rate of 100,000,000 frames per second.

Dr. Zarem is best known technically for his work in the field of instrumentation, especially on automatic instruments with an "electric memory."

PROGRESS, POLLUTION AND THE PUBLIC

by A. M. Zarem
Director, Los Angeles Division
Stanford Research Institute
Los Angeles, California

Southern California, already widely known for a large number of physical attributes, has in recent years gained nation-wide notoriety for quite another but related phenomenon—smog.

Traditionally a land of Paul Bunyanish character, the Los Angeles area shattered all predictions for its development during the World War II years. Between 1941 and 1945 the County population increased by nearly 2,000,000 people. Almost overnight one of the most agriculturally productive areas in the world became in addition a highly populated, highly industrialized area as well.

This area is also acknowledgedly endowed with unusual meteorological and topographical conditions. A majestic ring of mountains surrounds the County on three sides, only the ocean side being "open." Rarely does a strong wind sweep over Los Angeles. Instead, a soft, gentle motion of air (seldom exceeding 10 miles per hour) washes to and fro over the County; during the day the air moves from the ocean to the mountains; in the evening the movement is reversed.

The "unusual" or mild climate of Southern California is associated with a high pressure area which exists nearly all the year around over the Pacific Ocean. This "Pacific High" is responsible for a meteorological condition known as the Pacific Inversion Layer—a canopy of hot dry air, which on days when the layer is low, "seals" the Los Angeles area and prevents vertical mixing of its air.

Paradise?

These conditions have led early overenthusiastic boosters to refer to Southern California as an "air-conditioned paradise." They sold these western migrants well, and as the population of Los Angeles County mounted, first by 10,000, then 20,000 and 30,000 per month, there was a sudden awareness that something had gone wrong with the "air-conditioned" nature of the area.

Pollutants released by every conceivable type of activity of millions of people overtaxed the natural ventilation available. Somewhere in the development and expansion which took place between 1941 and 1945, a threshold seemed to have been passed.

On certain days a noticeable and dramatic decrease in visibility occurred. On many days people throughout the area complained of eye-smarting or irritation. More recently there have been increasing reports of damage to certain sensitive agricultural crops.

Two other characteristics seem to distinguish the Los Angeles area. One is the fact that there is an increased tendency for rubber products to deteriorate in the Los Angeles atmosphere. The other is a peculiar ozone-like odor which at times hangs over the entire county.

Citizens Aroused

As could be expected, civic-minded citizens of Los Angeles reacted strongly to these unfavorable conditions. For everyone, including industrialists, scientists and professional men, smog became an intimate thing. "What was it that caused the annoyance?" The answer in those early days was: "A combination of smoke and fog."

Since fog is considered a "natural phenomenon," it was logical that selected smoke-belching sources should draw the attention of the public. Citizens of the area found it easy to adopt the over-simplified philosophy: smog is smoke plus fog; get rid of all industrial smoke and smog will disappear. It was as simple as that.

Knowing no better, they totally ignored both the complexity and variety of effluents from all types of industry, from chemical plants, processing plants, refineries, etc. In addition, contaminants being discharged into the atmosphere from home incinerators, automobiles, buses, and a multitude of other sources were also ignored.

The possibility that invisible fumes and gases might be adding to the problem was largely overlooked, and the slightest suggestion that someone find out if smog were really only smoke and fog made no headway. The public mind became focused and fastened on the directness and simplicity with which smog could be eradicated.

The emotional approach to dealing with this complex technical problem came into full force. Knowing no better, the public did not attempt to give a frank evaluation of the technical difficulties that might have to be overcome before the air pollution problem could even be understood, much less effectively controlled.

Enabling Act Passed

During 1946 and 1947, various industrial groups, feeling they could be hurt by such an emotional approach and realizing the complexity and difficulty of the situation, reorganized their scientific air pollution committee—already of long standing—in order to study their contribution to the "smog".

In addition, various civic and technical committees were formed by several chambers of commerce in the area. As expected, however, Citizens' Action Committees and Reform Groups arose and a strong public clamor was set up for immediate corrective measures to rid Los Angeles of smog.

The usual result of such public interest is a law; and so in 1947, the California Legislature passed an enabling act. Following this, the Los Angeles County Air Pollution Control District was established to enforce corrective measures on all industry in the county.

Two noteworthy developments preceded the establishment of the Air Pollution Control District. In December, 1946, executives of the principal refining companies of the Western Oil and Gas Association appointed a committee to study the smoke and fumes situation in the Los Angeles area. At its first meeting its duties were defined as: "The identification of those materials in the atmosphere which result in irritation and poor visibility." This group later became the Committee on Smoke and Fumes of the Western Oil and Gas Association.

Early in 1947 the Scientific Committee of the Los Angeles Chamber of Commerce came into being. The primary function of this Committee was the organization of scientific-industrial advisory groups to work in cooperation with public agencies toward intelligent and effective reduction of the smog nuisance.

The fight against smog continues unabated today by both of these committees. They started from "nowhere" and the effect of their activities is now being felt wherever air pollution is a problem.

"Seeing" Is Believing

The men of industry, the technically trained, the scientists and professional people, all of whom are also part of the public, knew that the general public would be apt to indict as a pollutant any industrial effluent that could be seen.

They realized that "seeing" is a greater part of forming judgment than knowledge of what one is looking at—even a steam exhaust could be held up as a source of pollution. They also knew full well that when industry is under suspicion, anything it might do, however intelligent or constructive in the long run, would be immediately viewed as a means of "trying to get out from under."

But as sober-minded citizens they knew that before real progress could be made, someone would have to determine what contaminants were in the air and assess their relative importance. They faced the challenging question: "How can you legislate the control of something you cannot scientifically describe?"

Seeking additional scientific aid, the Committee on Smoke and Fumes approached various organizations and finally commissioned the Stanford Research Institute, a non-profit applied research foundation, to undertake a project:

"What is smog and where does it come from?"

Under this stimulus, the Institute started, in the spring of 1947, a program of atmospheric research which has since become the largest and most extensive privately-financed study of the atmosphere to be undertaken anywhere.

No Magic Wand

Although it was the original hope of the Committee on Smoke and Fumes that a single culprit — or at most, two or three—could be found to be responsible for the Los Angeles smog, it soon became apparent that no magic wand to clear the atmosphere was likely to be found. Far from it!

The scientists instead came up with a woeful story. The doctor who had been called with the fond expectation of administering a quick cure, instead, pointed out that the rudimentary tools for diagnosis were not even available at that date.

Sampling and analytical techniques that could be trusted were not known, and a whole field of instrumentation had yet to be developed before anyone could say how much of what was in the air.

The whole problem was characterized by newness and complexity and it became immediately evident that a sustained basic research program was essential. This was quite a shock at that time. After all, air pollution was not a new phenomenon. Other cities, in various parts of the country, with community-wide air pollution of unbearable intensity had found their problems yielded

to rather simple research studies and control methods.

Technical consultants brought from eastern cities and familiar with the successful air pollution reduction programs instituted by other communities had no reason to believe that the Los Angeles situation was very different or that it would not yield to conventional routine methods of attack.

Millions for Research

Since its establishment nearly five years ago, the Committee on Smoke and Fumes of the Western Oil and Gas Association has spent about $1,000,000 in financing research on the Los Angeles smog problem.

The Los Angeles County Air Pollution Control District has spent a similar amount in anti-pollution law administration and in research, and many many millions of dollars have been spent over the same period of time by industry in the Los Angeles area in reducing pollutants at their source. As a result, the answer to "Where do we stand today?" seems to depend upon who you are.

The Air Pollution Control District, in its latest report, states that it has removed from the atmosphere 35 percent of the total of all pollutants over which controls are established.

Ordinary citizens complain that when smog occurs, it is as bad or worse than ever although many claim it occurs less often.

Scientists, familiar with the results of the various research programs in progress and able to evaluate the technical problems involved, believe that basic facts are now known which eventually may lead to effective control of smog. Much of this information is available in a recent report of the Stanford Research Institute covering its studies of the Los Angeles smog problem.

Smog Knowledge to Date

The Institute's activities have stimulated a wide variety of researches at many laboratories, which, summarized, give the following picture of where we stand today with regard to knowledge about smog:

1. The importance of local topography and of the meteorological conditions conducive to smog formation is clearly understood. With the aid of a Smog Index developed by Stanford Research Institute scientists, it has become possible to forecast smog conditions 48 hours in advance with an accuracy of nearly 85 percent.
2. The reduction in visibility during smoggy days has been shown to be caused by three types of particulate matter: (a) hygroscopic materials which absorb moisture from the air to form tiny liquid droplets or mists; (b) opaque materials such as carbon and fly ash from combustion, dusts, etc., and (c) transparent, light-scattering crystalline substances.
3. The enormous task of developing trustworthy instrumental, sampling and analytical techniques for detecting, identifying and determining the quantity of both particulate and gaseous contaminants in the atmosphere has had fruitful results.

   Over 50 different substances, some in concentrations of only a few parts per hundred million, and particulate matter in sizes below one micron, have been identified and their importance assessed. Automatic instruments now faithfully record the concentration of contaminants which were not even suspected to be present in the atmosphere until very recently. Almost unbelievably clever analytical techniques have been perfected.
4. Smoke, fly ash and visible sources of pollution are not the major factors in

Subcommittee of Incinerator Committee which met in the Board Room of Mellon Institute recently. Left to right: A. D. Muldoon, Combustion Supervisor, Allegheny County Bureau of Smoke Control, substituting for C. W. Daubert, who was ill; T. W. Cadmus, President, Nash, Cadmus, and Voelker, Inc., New York; H. W. Lincoln, Director of Application Engineering, Morse Boulger Destructor Company, New York, chairman; and C. J. Flowers, Incinerator Department, Plibrico Jointless Firebrick Company, Chicago, substituting for C. John Kure, of the same company, who was unable to attend. Other members of the committee, who sent their regrets, included Austin Tomlinson, Detroit Department of Buildings & Safety Supervision; and Richard Goder, of Joseph Goder Incinerators, Inc., Chicago.

the Los Angeles smog problem. The wide-spread damage to crops reported in the area is not due to sulfur dioxide. Compared to similarly industrialized areas, Los Angeles County is probably the cleanest in the country. The ordinary pollutants considered to be so important in other areas exist in far lower concentrations in the Los Angeles atmosphere.

5. No one substance or chemical compound has yet been found in the Los Angeles atmosphere in sufficient concentration to account for the eye-irritating effects of smog. Also no localized area of eye irritation, such as would be expected to exist near the source of emission of a tear-producing substance, has yet been found.

   Studies in the Institute's Smog Chamber have led to the belief that the eye-smarting properties of smog are due to either the combined effects of several pollutants or to a tear-producing substance formed by reaction in the atmosphere of perhaps several non-lachrymatory pollutants (those that do not produce tears).

6. The best clue to the obnoxious characteristics of Los Angeles smog seems to be the uncommonly high oxidizing ability of smoggy air. The "oxidant" in the Los Angeles atmosphere has been variously suggested to be due to ozone, organic peroxides, oxides of nitrogen and other invisible elusive chemical compounds.

Is Ozone the Oxidant?

The total oxidant in the atmosphere seems thus far to correlate better with the onset of smog than any other indicator thus far found. Its behavior in cracking rubber products and in other reactions had led to the suggestion that most of the oxidant is indeed ozone.

It has been suggested that high concentrations of ozone can be formed as a result of photochemical reactions between atmospheric oxygen and the oxides of nitrogen which are released by combustion processes.

However, regardless of its identity, it has been postulated that the oxidant can react with a wide variety of organic compounds such as hydrocarbons, aldehydes, peroxides, etc., which are contributed to the atmosphere by every type of combustion process and by evaporation.

The combustion of gasoline, garbage, wood, coal, fuel gas, oil, garden clippings or other organic materials releases hundreds of organic compounds, hydrocarbons, saturated and unsaturated, aldehydes, etc., which by themselves are harmless, but which may react in the atmosphere to form a variety of noxious compounds.

Whether they do or not, and how effectively they react in the atmosphere has yet to be determined. Much of this work has been stimulated by experimental studies of Dr. A. J. Haagen-Smit of the California Institute of Technology, who initially suggested that these reactions occur.

7. *There are in Los Angeles nearly 1,000,000 individual home incinerators and backyard burning pits. This area is the only large metropolitan center in the United States known to dispose of rubbish in such an archaic and inefficient manner.*

   Of over 9,000 tons of rubbish burned each day, about half (4,000 to 5,000 tons a day) is garden trash, paper, etc., burned in these incinerators. The other half is burned by industry. The Los Angeles area has the highest per capita concentration and the highest total number of automobiles, buses and trucks of any area in the country.

   Over 2,000,000 of these vehicles burn about 10,500 tons of gasoline (3,500,000 gallons) each day. The amount and type of contaminants released by both exhaust and blow-by have yet to be determined. Over 7,000 tons a day of fuel oil and some 20,000 tons a day of natural fuel gas are burned in Los Angeles County.

   Evaporation from gasoline, paints, varnishes, solvents, and other organic materials contributes additional quantities of organic compounds to the air. The total amount of fuels and rubbish burned in Los Angeles County come to a staggering figure of over 50,000 tons per day. This is the principal source of pollutants put into the Los Angeles atmosphere.

8. The most fertile field of future research appears to be a study of organic matter in the air and the possible reactions that can take place in the atmosphere. Hydrocarbons in particular and other compounds that can be formed from them have been receiving intensive scientific attention and the research tempo must increase.

   The sources of organic materials, hydrocarbons, aldehydes, etc., and the invisible products of incomplete combustion and evaporation are so multitudinous that there is no room left to doubt that the Los Angeles smog is a community problem.

The Conservative Approach

The scientific and technical contributions of the vast amount of research work done on Los Angeles smog will undoubtedly have effects far beyond the immediate local problem. Hopefully the results of these researches will become available through this medium for use by the intelligent public officials who read them.

As we continue our economic development, it is essential that the public be informed on what part we all play in the air pollution problem, in order that we may all effectively shoulder the responsibility for supporting research and for controlling such problems.

Frantic outbursts and emotionalism must be swept away. The interdependence of the public and its supporting industry is obvious. Industry is part of the public, and no progressive executive, given the facts, would indiscriminantly pollute the air or ignore his community responsibility. The public must also face the facts. We must all realize that we cannot live in a highly populated, highly industrialized area and still breathe country fresh air.

The true complexity of the Los Angeles smog problem as revealed by research has clearly and dramatically shown the way for any community to intelligently approach its air pollution problems. While specific pollutants, including smoke and noxious chemicals, should be regulated by law, *intensive research must be sponsored in order to determine what contaminants are present, to assess their importance, to determine their sources, and to encourage the development of sound technical and economic means for reducing such effluents.*

Without a clear understanding of the nature and complexity of air pollution problems, an effective course of control action cannot be chosen. Smog will yield to intelligent control when coupled with and supported by proper scientific attention.

Only when the public clearly understands these problems, will it be willing to bear the cost of such an intelligent program. It is our responsibility, whether engineers, executives, scientists, technicians, or public officials, to foster this understanding so that we may all contribute our best to the elimination of the smog nuisance.

This pleasant vacation spot, with its clean buildings, clear air, and magnificent sunshine, has pollution problems nevertheless. Miami is getting noisy, say the City Fathers, and noise is a type of air pollution. E. C. Luster is getting set to put the damper on.

Noise Considered Air Nuisance in Miami

Is a noise an air nuisance?

You bet it is, says the City of Miami. Moreover, something is being done about it. Ordinance No. 3720 defines a nuisance as follows:

"Persons shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisances or annoyance to any considerable number of persons or to the public or which endanger repose, the comfort, health, or safety of any such persons or the public which cause or have a natural tendency to cause injury or damge to business property."

The city has grown to such a great extent industrially, and industry has spread out and been zoned to residential property, that the administration was forced to cope with the problem of noise which came from many of the industries.

In addition, says E. C. Luster, Chief Inspector of Boiler and Elevator Inspection of the Department of Public Service (he's got a title even longer than that of our Association!), in the past year there have been installed in the City of Miami close to 1,500 window-type air conditioning units in residences alone, and more than 800 units ranging from five tons up, in theaters, churches, office and other public buildings.

The whir coming from these units is considered excessively annoying. Excessive noises have been construed in Miami courts as nuisances, and Mr. Luster's department has been given the authority to abate them. Such noises included vibrations, the crowing of cocks, barking of dogs, or any noises emanating from any animal, fish or fowl.

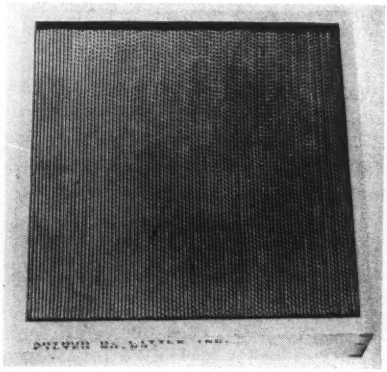
The city is desirous of formulating a noise abatement ordinance to cover noises separately from air pollution. If any member knows of such ordinances, please advise Mr. Luster the cities where they apply, and he will write direct for copies to assist him in completing his ordinance.

"Our city," he says, "is moderately quiet as compared with other cities of our size, but we want to be just a step ahead with the passage of our ordinance."

There's civic pride for you!

New Filter Announced

An absolute air filter, developed originally for the Atomic Energy Commission and capable of removing better than 99.98 percent of all dust, smoke, fumes, radioactive particles, spores, and other microscopic foreign matter from the air, is now being produced for commercial use by the Cambridge Corporation, Syracuse, N. Y.



Indications are that the filter will be particularly valuable in the manufacture and processing of photographic film, and the manufacture of chemicals, electronic tubes, and optical and other precision instruments where completely clean air is required.

The filter will also have its uses in pharmaceutical plants where mold spores as well as bacteria-carrying dust must be avoided; in laboratories of all kinds, in hospital operating and delivery rooms; and in automatic telephone exchanges.

A large class of users will be the growing number of firms working with radioactive materials where escaping dust would be a hazard, and plants where toxic fumes emitted as a by-product of an industrial process must be prevented from entering the atmosphere.

The filter is being manufactured at present in two sizes with rated capacities of 500 and 850 cu. ft. of air per minute. Individual units may be arranged in multiple banks of filters in built-up ventilating or exhaust systems or central station air conditioning systems to handle any desired amount of air.

ASSOCIATION RECEIVES INVESTIGATIONAL GRANT!

Donor Allots $5,000 Yearly for Air Pollution Study

A grant of $5,000 annually has been given to the Air Pollution and Smoke Prevention Association of America for the purpose of furthering, through research, the knowledge of various broad studies in air pollution control.

Preliminary private announcement was made to the Board of Directors at the September meeting by Thomas C. Wurts, Director of the Allegheny County Bureau of Smoke Control and Chairman of the AP&SPAA Special Management Committee. He had received the welcome communication from the donor, who wishes to remain anonymous.

The donor and Dr. Edward D. Weidlein, President of Mellon Institute, had discussed the need of additional air pollution control research during several conversations earlier in the year.

Dr. Hill Notified

Further discussions on the grant were conducted during the week of November 12, when Industrial Hygiene Foundation had its annual meeting, which was attended by Dr. George R. Hill, Chairman of AP&SPAA's Research Committee and consultant of the American Smelting & Refining Company.

Dr. Hill, Dr. Weidlein, W. C. L. Hemeon, AP&SPAA member and Director of Engineering, Industrial Hygiene Foundation, and Mr. Wurts met and gave the grant thorough consideration.

Their recommendations will be placed before the Research Committee through Dr. Hill, and appropriate action will be taken in the near future. There are several projects which can well be studied by means of this grant, and the decision as to which one be undertaken first is being left to the discretion of the Research Committee.

"We are delighted with this expression of confidence in us," said President John L. Hodges when informed of the grant. "We will do everything in our power to use the money worthily for the betterment of mankind. We are deeply grateful to the donor for his generosity in making this grant available to us."

Who's Who In Air Purification

Sumner B. Ely, twice president of the Smoke Prevention Association of America, who has been superintendent of the Pittsburgh Bureau of Smoke Prevention for almost 10 years, is an engineer whose acquaintanceship in his professional field goes back to the turn of the century.

After graduation from Massachusetts Institute of Technology he served the board of engineers of the United States Steel Corporation as secretary, and in 1908 he was appointed chief engineer of the American Sheet and Tin Plate Company. He had charge of the engineering work in more than 20 plants in the Pittsburgh district.

Professor Ely left the ranks of industry and joined the faculty of Carnegie Institute of Technology in 1921, where he taught combustion, thermodynamics, and power plant engineering. Three years later he was asked by Governor Gifford Pinchot to serve as a consulting engineer on the Pennsylvania Giant Power Survey. He wrote the section of the report which was concerned with industrial power.

Conference Secretary

When the first international conference on bituminous coal was held at Carnegie Institute of Technology, Professor Ely was its secretary. He continued to serve in this capacity, as well as vice chairman, in the two succeeding conferences held in later years.

In 1936, Professor Ely was appointed a consultant to the director of the World's Power Conference, held in Washington, D. C. Four years later he became professor emeritus at Carnegie Institute of Technology, and in the following year Mayor Cornelius D. Scully appointed him technical advisor on the Pittsburgh Commission for Smoke Elimination.

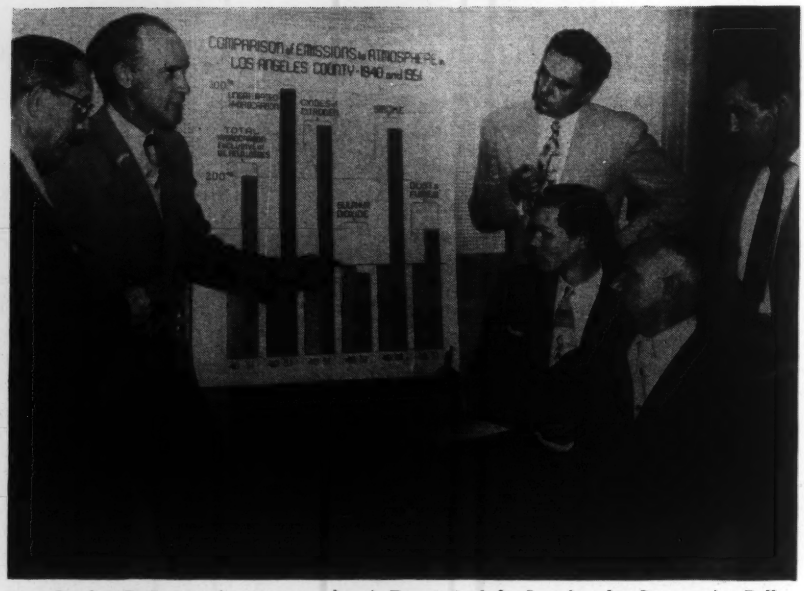
Pittsburgh owes this engineer a great deal for the manner in which he helped to guide its program toward cleaner air. Besides being a registered professional engineer in Pennsylvania, Professor Ely belongs to the American Society of Mechanical Engineers, the Engineers' Society of Western Pennsylvania, the American Association for the Advancement of Science, and the Pittsburgh University Extension Society, of which he was president for two years.

He is further a member of Pi Tau Sigma and Theta Xi. He is a former member of the Society for the Promotion of Engineering Education, the American Society of University Professors, and the Society of Automotive Engineering.

Wrote Many Articles

Professor Ely has been a prolific writer in his many active years. He has made at least five contributions to the literature of the Smoke Prevention Association and its successor, our present association. His subjects, particularly in recent years, have been concerned with various types of air pollution. He has also written on power and fuel, and is the author of a book entitled *The Theory of Engine Balancing.*

Professor Ely



Gordon P. Larson (pointing to chart), Director of the Los Angeles County Air Pollution Control District, makes a periodic progress report to reporters from the five metropolitan newspapers in the City of the Angels. Newsmen shown are, left to right, standing, James E. Lewis, Examiner; Don Kirby, Daily News; Arthur Hewitt, Herald-Express and, seated, James F. Denyer, Mirror and Maury Beam, Times.

When You Meet the Press

Good press relations help an air pollution control official immeasurably in doing his job. Frequent articles are not only necessary to let citizens know what the official and his department are doing, but also serve to keep the general public informed on the many complex problems that an air pollution control official must deal with daily.

A sympathetic and understanding class of readers will make the official's job easier and more effective.

How can this desirable end be obtained?

Sometimes it's difficult, sometimes quite easy. It depends principally on the air pollution control official himself and the manner in which he makes information available to the daily press.

If you're biblically inclined, it won't hurt to take as your slogan the words from Matthew 5, 16, which state: "Let your light so shine before men that they see your good works." If the people in your community don't have a chance to see or hear the progress that is being made by your department, how can they know that they have an effective air purification operation?

In order to do the job as well as possible, the air pollution control official must first of all know something about newspapermen and the manner in which they work. And then he must learn to fit his own news into their method of operation.

They Want News

The newspaperman is, first of all, after news. He wants to know about things that are happening so that he can write about them understandingly. He is interested in all the news that's going on, and day after day gathers much more than he can possibly print. Therefore news competes with itself, and only the most interesting news makes the paper. That's true on the local level as well as the international.

Air pollution control can be a dull subject. If it is, it won't merit much attention by the reporters. It is up to you to make the subject interesting. Then you'll have the newspapermen flocking to your door.

Of course, it is not always possible to have news for them. News sometimes takes months to develop. But even the smaller happenings in your career or in that of your office and its force have a certain news value—even if it only calls attention to the existence of your department.

If you are making any changes in your staff—promotions, transfers—see that the reporters hear of them. Bigger news may concern proposed amendments to your ordinances, the fining of a particularly stubborn violator, or the voluntary cooperation—at considerable cost—of some civic-minded industry in your town.

Then, if there isn't anything to give reporters from your own department, it will help you if you pass on tips to them about happenings elsewhere. There might be something newsworthy in your church which the pastor is unaware of. Your lodge, your fraternity, your bowling club, or someone in your neighborhood are all doing something which would be of interest to the newspapers. Tell them about it and earn their gratitude.

If you are located in City Hall or some other public building, there are usually reporters from each of your local newspapers assigned to "cover" the public officials. Cultivate these men and women, urge them to drop in to see you every so often, even if you don't have anything immediate to give them. Make friends with them, and pretty soon you'll find them wanting to go out of their way to get you news stories.

Sometimes you yourself don't see the forest for the trees, and a story which seems perfectly ordinary to you is something that fascinates a reporter because it is actually newsworthy, only you didn't think of it that way.

The reporter has been trained to find out these stories.

If you are not visited regularly by reporters from the competing papers in your community, then see to it that news from your activity reaches the papers whenever it warrants publication.

Either delegate someone from your department to bring the news to the city editors, or, better yet, contact these officials personally. This will serve a twofold purpose: first of all, it brings you in direct contact with the working press; secondly, while talking to the editors about the story, you have a chance to correct any false impressions they may have as to the nature of your work or as to the proper interpretation of the news you are bringing them.

One of the most important things for a reporter to learn is that your job is a very complex one, and that, to do it properly, you actually have to be a bit of a meteorologist, an engineer, a chemist, a bacteriologist, a physicist, and Lord knows what else.

It is wise, even when receiving reporters in your office, to have your news written out, with enough copies to go around and a few to spare. Hand each reporter a copy and then be prepared to discuss the subject with them until you feel sure they have the proper grasp.

That Most Important "Feel"

Don't worry whether your write-up is proper journalese or not. The reporters will rewrite it anyway to suit their own tastes when they get to the office. And, in the case where you or a member of your department takes the "copy" to the city editor, he will assign a rewrite man to rewrite the material.

Don't be offended at this. The newspapers are independent, and they would not relish having an item in their papers which is word for word as it is presented in a rival paper. Your main concern is to see that the story is presented properly.

Because your subject is necessarily complex, you are going to find reporters making mistakes now and then. It would be nice if you could ask them to show you what they have written before it goes into type, so that you could correct any inadvertent errors beforehand, but that is not possible, for a whole lot of reasons. You must just trust to luck that the story will be right. After all, the reporters are trained to be accurate, and consider inaccuracy a cardinal sin, but with the best intentions in the world mistakes are bound to creep in.

As long as they are not too serious, and as long as the "feel" of the article is basically right, there is nothing too much to worry about, except to keep on teaching the reporters to put a high value on the complexity of the subject.

If, as often happens, the newspaper assigns the same reporter to "cover" you and your activities, you will eventually be able to educate this reporter in air pollution control problems, and he will thus be able to write far more intelligently about them.

Here in Pittsburgh we have a number of very able reporters who have given the cause of smoke control great attention in the past six years. One of them has what he calls his "smoke typewriter", which he uses just to write stories about smoke control. He's being facetious, of course, but what he means is that he is so thoroughly versed in air purification in the district that he needs a special typewriter to set down the facts.

Your main job is to be patient. Getting angry at a reporter or at a paper will get you exactly nowhere. Of course, you should point out inaccuracies and discrepancies to the newspaper. But do it in such a way that you give no offense and that the reporter will not feel chided. Make him believe he is being educated, which he is!

Watch first editions. If the story is not accurate, call the paper and point out the inaccuracies to the city editor. He will correct them in time for the second edition and the subsequent ones.

If the mistake is minor—forget it! If your story runs a whole day, be thankful that it is seen by all the newspaper's readers. But if you want to correct minor errors, then the paper is annoyed and, rather than do a lot of "fixing," to use the technical term, the paper will pull the whole story out. Thus you get no publicity for the work you are doing, and all your efforts are in vain.

A Different Twist

Don't become too alarmed at the manner in which the story you've given the reporters sees the light of day. Reporters are always looking for the unusual, and in an unusual story they are still looking for something even more unusual.

Take the case of last fall's Cleaner Air Week, so wonderfully publicized by Charlie Howison and his committee. Twenty-one governors, and the mayors of a great many cities, large and small, signed proclamations observing this week in their constituencies.

And what did the Cincinnati *Post* do to call attention to the promotion? This energetic newspaper was not content to cover all the material that Howison suggested. It went a step farther. And here comes that special twist.

A mannikin was dressed in a clean white dress and placed on a prominent corner in the city. Every night the dress was removed to a laboratory and there analyzed for dust accumulation. The next day the mannikin, in a new clean dress, was placed in another spot in Cincinnati, to measure the dustfall there. Thus the citizens could have an idea of where the cleanest places in town were!

And, for extra good measure, the *Post* set a mannikin in Times Square, New York, to make a check there. The dustfall in New York was many times heavier than in Cincinnati!

This promotion stunt was a very clever way of telling the people, in graphic form, to be ever mindful of the goal so many communities set themselves: cleaner air.

Glorious Gloria

Here's another example of the manner in which a subject can be properly exploited. The Department of Smoke Regulation of Columbus, Ohio, had a booth at the Ohio State Fair back in August. Quite a few people stopped to see the

Monthly meeting of the Washington Terminal Smoke Committee. Seated, left to right, M. E. Sandridge, Chesapeake & Ohio Railway; E. O. George, Chesapeake & Ohio Railway; G. B. Curtis, Road Foreman of the Pennsylvania Railroad; Luther M. Parker, Smoke Control Engineer, Richmond, Va.; H. K. Kugel, Smoke Regulation Engineer, District of Columbia; M. G. Stewart, Chairman, Washington Terminal Smoke Committee; V. J. Wintermyer, Secretary; W. P. Prim, Pennsylvania Railroad; G. W. Shelleman, Baltimore & Ohio Railroad; H. F. Deery, Baltimore & Ohio Railroad; J. Swann, Smoke Inspector, District of Columbia. Standing, left to right, L. L. Rogers, Road Foreman of the Pennsylvania Railroad; J. A. Long, Jr., Washington Terminal Company; C. H. Grove, Smoke Inspector, District of Columbia; H. C. Guyton, Pennsylvania Railroad; B. H. Phillips, Baltimore & Ohio Railroad. The meeting is usually held in the conference room of the Union Station, Washington, D. C.

display, which was on a high technological level.

But what gave real impetus to the Smoke Regulation Department's work was the fact that Gloria Swanson, who visited the fair, commented on the pure air of Columbus—so much better than that of other cities she visited.

Her remark was printed in all the Columbus papers, and thus the Smoke Regulation Department received far more attention — and credit — than by mere showing of facts and figures at its booth. It's the sort of break public relations men would give their right eye for, and so seldom get.

They're After Drama

Newspapers are always after the dramatic, and sometimes you may feel that there's not much drama to your work. But by cultivating reporters, you will find that they may take a special interest in you and your problems, and do some special stories for you — stories their trained newspaper eye can see as having distinct possibilities, although to you they may seem commonplace.

For instance, a reporter may decide to spend a day with one of your inspectors. This sounds like a routine assignment, but the reporter may play up the inspector as another type of sleuth—looking for violations of the clean air ordinance—and sleuths are always glamorous.

There'll be a cameraman along, and before you know it, he'll take several dozen pictures, the reporter will document the day's doings, and the newspaper will have another interesting feature story for next Sunday.

That's how articles are built. And if you keep in close and friendly touch with your reporters, you'll get your share of the publicity to which your department is entitled.

And don't worry too much about a "bad" story. They will happen, and when they do, think about another and better story which you can release in a week or a month to put your department in a better light with the newspapers. The reporters don't carry grudges, but can make it mean for you if they find you carrying one.

If the Secretariat can be of any help to you in planning publicity for your department, let us know. It's physically impossible to cover all the angles to newspaper publicity in one article such as this.

AIR POLLUTION PROBLEMS STRESSED AT INDUSTRIAL HYGIENE FOUNDATION ANNUAL MEETING

by Wesley Burr
United States Steel Corporation

Attended by one of the largest representations ever recorded, the 16th annual meeting of the Industrial Hygiene Foundation at Mellon Institute included a number of excellent speakers on various phases of air pollution problems.

The theme of the meeting — "The Executive and Health" — was amply covered in a panel including Dr. Howard R. Hartman, Mayo Clinic; Dr. E. A. Irvin, Medical Director, Cadillac Motors Division, General Motors Corporation; Dr. Henry W. Brosin, Medical Director, Western Psychiatric Institute. The moderator was Lemuel B. Hunter, Manager of the Industrial Relations Department of the Inland Steel Company.

Don G. Mitchell, President of Sylvania Products Company, was the keynote speaker. He made a semi-philosophical approach to the problem of increasing worker efficiency, calling for restoration of the dignity of individual employees through fulfillment of each employee's desire for personal recognition.

Mr. Mitchell demonstrated how this had been accomplished at Sylvania by decentralization—smaller plants in suburban locations to effect closer contact between employees and management. The basic tenet of this discussion can be applied to other industries—even the steel industry. But the problem in the latter case is complicated because decentralization is impractical.

Dust Survey Techniques

James F. Morgan, chemical hygienist of Industrial Hygiene Foundation, spoke on "Dust Measuring Instruments and Dust Survey Techniques." He reviewed the procedure employed in surveying industrial working areas for noxious dusts. Several types of impinger-type dust collectors were discussed and demonstrated. Arbitrary limits for "harmful," "decent," and "desirable" dust concentration levels were given.

Prof. Philip Drinker, of the Department of Hygiene, Harvard University, spoke on "Sulfur Dioxide, Sulfur Trioxide, and Sulphur Dioxide Mists." He discussed in general terms the effect of sulfuric acid aerosols on guinea pigs and reaction of sulfur dioxide with atmospheric water.

Professor Drinker pointed out that aerosol size is an important factor — fine sulfuric acid aerosols have little effect on mammals even when present in concentrations large enough to limit visibility, while five to ten parts per million of a coarser sulfuric acid aerosol can cause acute discomfort.

He further pointed out that sulfur dioxide is not an important pollution factor since it is almost immediately oxidized to sulfuric acid. Professor Drinker stated that sulfuric acid aerosol concentrations observed in field tests seldom exceed .01 parts per million, whereas two or three parts per million would be required to induce even mild discomfort in humans.

Outdoor Air Pollution

Floyd H. Viets, Consulting Engineer, Los Angeles Air Pollution Control District, presented an excellent general description of the Los Angeles smog problem. He praised the Los Angeles smoke control ordinance, which bases amounts of permissible emission on the amount of raw material processed (ranging from .28 percent of process weight in cases where the amount of material processed is 1,000-lb. per hour, to .18 percent of process weight, in cases where the amount of material processed is 10,000-lb. per hour).

Mr. Viets stated that an expenditure of $600,000 was required to equip four 50-ton open hearth furnaces at Columbia Steel Company with Cottrell precipitators. These precipitators, Mr. Viets said, removed 95 to 98 percent of the particulate matter before the exhaust gases reach the stack.

Robert T. Pring, Technical Director of the American Wheelabrator and Equipment Corporation, discussed cloth bag filtration of aerosols. He was principally concerned with the recovery of valuable fumes from smelting operations. However, the high temperatures cited for some of these operations (500 to 550 deg. F.) suggested that cloth bag filtration might be practical for some operations hitherto not considered because it did not seem feasible to do so.

Air Pollution Legislation

A general discussion of air pollution followed by a nine-point outline for air pollution control at the state legislature level was presented by George E. Best, Mechanical Service Engineer, Mutual Chemical Company of America.

His outline included provision for the establishment of state bureaus for coordination of effort, law enforcement, research and dissemination of information; establishment of local air pollution zones within the state; and appointment of commissions made up of local citizens to govern the various local zones. Federal permission for rapid amortization of investments in smoke control equipment was deemed necessary to reduce the burden on industry.

Report on Indianapolis

by J. G. MINGLE
Superintendent
Indianapolis Bureau of Air Pollution Prevention

Excerpts from an address given during Cleaner Air Week at the Rotary Club, Hotel Claypool, Indianapolis, October 23, 1951.

It will be my purpose to give you some pertinent facts about the air pollution prevention or anti-smoke ordinance; how we operate in its enforcement; some of the results accomplished; and a few of the problems we are up against in cleaning Indianapolis' atmosphere.

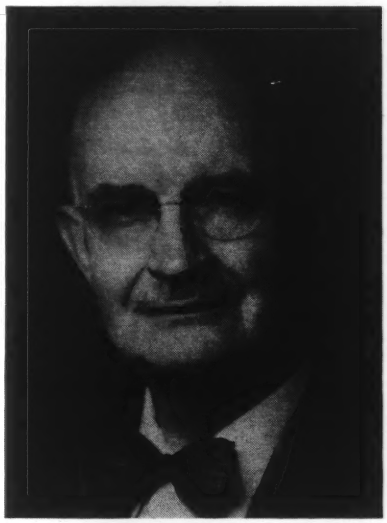
The ordinance is not primarily a smoke ordinance, but includes pollutants other than smoke, such as soot, cinders, noxious acids, fumes, and gases. The essence of this ordinance is that it is unlawful to produce smoke of a density equal to or greater than No. 2 Ringelmann.

For any anti-smoke ordinance to be practical as well as effective, its enforcement must be approached from a realistic viewpoint. Certain exceptions are permitted, the most important of which is that when a new fire is built in a furnace, or the fire is being cleaned, or soot is blown, it is lawful to emit No. 2 smoke for a total of nine minutes, and No. 3, 4, and 5 smoke for a total of only six minutes in any one hour. Beyond these periods, the ordinance is violated and, upon being observed, a violation is charged.

Nuisance Clause

In addition, the ordinance includes a nuisance clause which states:

"No person, firm or corporation shall cause or allow the escape from any stack into the open air of such quantities of soot, cinders, noxious acids, fumes, or gases in such place or manner as to cause injury, detriment, or nuisance to any person or to the public, or to endanger the comfort, health, or safety of any such person or of the public, or in such manner as to cause or have a tendency to cause injury or damage to business or property."



J. G. Mingle

The author of this paper was recently reappointed City Combustion Engineer of Indianapolis by Mayor-Elect Alex M. Clark. Mr. Mingle, a smoke combustion engineer for 38 years, was originally appointed August 2, 1949.

Thus, in addition to the production and emission of smoke being unlawful, it is also against the law to allow the escape into the open air of other pollutants noted.

Section Amended

In order to strengthen our position in cleaning up the atmosphere and to enable us to control pollutants other than soot, cinders, noxious acids, fumes or gases, we have recommended to the Board of Public Safety that the words "dust, dirt, fly ash, mists, vapors, strong odors, noxious acids and gases, and other forms of atmospheric pollutants" be added in the form of an amended section.

We have also recommended that "outdoor incinerators and approved trash burners used by occupants of private dwellings to dispose of ordinary household papers and combustible material" be brought under jurisdiction because of the numerous complaints made against them during the past six months for producing a nuisance but not necessarily a dense, unlawful smoke. We particularly wish to get under control the practice of burning garbage in outdoor incinerators and trash burners.

Our general enforcement policy is to attack pollution problems in a realistic and businesslike manner by controlling what comes out of the stack, rather than by regulating the kind of coal that goes into the furnace.

At all times we impress offenders that the production of smoke is not only a disobedience of the law but also a waste of fuel and energy, and that smoke represents money thrown away never to be retrieved. We also point out that fuel conservation is as economically wise during peacetime as it was during the war period. We hold frequent conferences with many violators in order to get on common ground and to assist them in solving their pollution problems.

Maintain Pleasant Relations

We continually strive to secure the cooperation of those who have been found responsible for the production of smoke and maintain pleasant relations with them. This policy of promoting mutual cooperation in working out the solution of smoke problems rather than by taking violators into court has, in our opinion, been productive of good results.

In addition, we have solicited and received the wholehearted support of such groups as the coal producers and coal dealers, heating equipment manufacturers, boiler and stoker manufacturers, manufacturers of fly ash collecting systems, the various engineering societies, the utilities, the Indianapolis Automobile Wreckers Association, Coal Heating Service, the Indianapolis Apartment Owners Association, the public school system, and many others.

Our main objective is and has been the abatement of all smoke, whether lawful or not, to the absolute minimum. We work on the premise that most smoke is unnecessary from any point of view, that it is a waste of fuel and power, that most of it is due to poor firing methods or improper fuel burning equipment, and that from a civic standpoint it should

not be allowed if for no good reason other than civic pride.

We measure our accomplishments by the number of violators who have been brought under control rather than by a list of ordinance offenders who have been served with affidavits and brought into court.

Perseverance Pays

Our most effective procedure in bringing ordinance violators into line or under control is dogged perseverance. However, in all of our contacts with ordinance violators, our objective is to promote mutual cooperation. Instead of exercising police powers solely, we use our knowledge and experience in assisting violators to solve their air pollution problems.

As to procedure in general, when an ordinance violation is observed against an offender, our inspectors immediately go into the plant and make a thorough survey. In this survey, they determine among other factors — the character of the coal burned, the methods of firing, the condition of the equipment, and the attitude of the personnel.

In the case of hand-fired installations, the inspector gives a demonstration of approved firing methods on the first call. If it is found that a violation is due to defective equipment which is in need of replacement or repair, recommendations are made to that effect, and that it be done at the earliest opportunity.

When unlawful smoke is due to the use of coal in equipment not adapted to burn it smokelessly, we advise the violator to contact his coal supplier for recommendations of another class of fuel. If the fireman or janitor is found to be careless or indifferent in his duties, warnings are given to mend his ways.

In the more flagrant and difficult-to-control cases, a conference is arranged with the management or agents of the offending plant, either at our office or at the plant. At our request, representatives of the coal supplier, manufacturer of the equipment involved, the janitor or fireman, and others, are invited to be present in a joint attempt to work out a solution of the air pollution problem. In many cases, the offender's attorney is asked to be present.

Dealers Notified

A copy of the ordinance violation notice is sent to the fuel dealer supplying the coal, and also to the Coal Heating Service, both of whom in many instances conduct their own investigation and make recommendations to abate smoke conditions and assist in keeping their customers out of further trouble.

In the cases of larger commercial and industrial plants who purchase their coal directly from the coal producers in carload lots, copies of violation notices are sent to the coal producer who immediately extends engineering and inspection services to his purchasers.

Where defective or improperly operating equipment is involved, a copy of the violation notice is sent to the manufacturer, who almost invariably promptly sends a field engineer to the plant to correct the trouble.

City Statistics

Indianapolis, a typical American city, has a population of about 427,000, a metropolitan count (Marion County) of about 532,000, and an area of 55 square miles.

It lies in the center of a high volatile coal burning district, coal of this class being one of the state's chief products.

Indianapolis has about 133,000 coal-burning units, made up of about 80,000 domestic hand-fired furnaces, 40,000 domestic stoves, and 10,000 domestic stoker-fired furnaces, 450 large industrial furnaces, 150 commercial furnaces, such as hotels, hospitals, laundries, dairies, etc., 1,400 six-room or more apartment groups, 600 modified apartment or rooming house groups, and 150 schools and libraries.

As a matter of general interest, the city has about 27,000 domestic,150 commercial, and 100 industrial oil-fired units, and about 7,000 domestic, 1,000 commercial, and 350 industrial gas-fired units. The Citizens Gas and Coke Utility is now in the process of releasing about 4,000 permits for the use of gas in domestic gas-fired heating plants.

Approximately 4,000,000 tons of coal are used yearly in Indianapolis, about equally divided between the Indianapolis Power and Light Company, Citizens Gas and Coke Utility, industrial usage supplied principally by producers, and that handled through coal dealers and yards. It is estimated that over 3,000,000 tons of high volatile coal are burned yearly in the city, roughly 7½ tons per capita. Indianapolis uses about one percent of the total mined in the country per year.

Industrial Abatement

Smoke abatement in commercial and industrial plants has been accomplished by the installation of new high-pressure boilers and mechanical stoker equipment, and, to a lesser extent, by overfire air systems, the conversion from coal to oil firing, and changes to a lower volatile class of coal.

Some of the industrial plants who have installed new high-pressure boilers or mechanical stokers during the past two years are:

Crown Laundry and Dry Cleaning Co.
Eli Lilly & Co. (two units)
General Dyeing Co.
Indianapolis Power & Light Co.
(Perry W Plant)
Indianapolis Drop Forging Co.
National Starch Products Co. (two units)
Liquid Sugars Co.
Lux Laundry & Dry Cleaning Co.
Mechanics Laundry
Wm. P. Jungclaus Co.
Radio Corporation of America
Real Silk Hosiery Mills
Riley Hospital
Indiana Medical Center
The Glidden Company (two units)
U. S. Rubber Company
Warren Hotel
Fame Laundry

About a dozen commercial plants converted from coal to oil firing, about the same number of commercial boiler plants installed overfire air systems, and about two dozen commercial boiler plants and apartment and rooming house heating plants changed from a high to a lower volatile coal.

About a dozen other smaller new boiler installations, both coal and oil-fired, have been installed since early in the year. All will add their share to the abatement of potential smoke in the city. Most of these plants were producers of unlawful smoke. Now all will operate with practically clear stacks.

Improvements Planned

Other plants are now planning or contemplating the installation of new boiler and stoker equipment, combustion control systems, over-fire systems, conversion from coal to oil and gas firing, and so on, in an earnest attempt to abate air pollution.

The Indianapolis Power & Light Company is installing a new high-pressure boiler at its Perry K Plant. The Inland Container Corporation is installing a new boiler unit, and Stewart-Warner Corporation has recently purchased a new boiler.

St. Joseph's Laundry of the Sisters of the Good Shepherd is installing two new

mechanical stokers. Reilly Tar and Chemical Corporation is planning on converting its stills to smokeless fuel firing and improving the operation of its boiler plant.

The Glidden Company is purchasing a dust collecting system that should completely clean up the air around its plant. The National Malleable Steel Castings Company has purchased a fly ash and cinder collecting system which will effectually abate its cupola emission products.

The International Harvester Company has begun an extensive and intensive analysis of its cupola dust problems. The Metal Treating Company on West 26th Street has just recently installed a vapor-type degreaser which has abated a particularly annoying and aggravating smoke and fume condition.

Utilities Cooperate

Our three utilities have been most cooperative in abating smoke to the minimum. The Indianapolis Power & Light Company, which burns about one-third of the coal used in the city, does not put forth more than a fraction of the smoke allowed under the exceptions of the ordinance.

Few utilities in the country are as conscientious in abating air pollution and operating clear stacks as the Indianapolis Power & Light Company. Practically all the coal used by the Citizens Gas & Coke Utility is processed, most of it with modern equipment and with very little smoke. The Indianapolis Water Company has had a consistently good record due to careful plant operation.

Railroads

The railroads, hitherto predominant smoke producers, have made excellent progress in the abatement of smoke from steam locomotives and round houses. All steam locomotives operating within and passing through the city are now equipped with steam jets and blowers.

There is a definite trend toward dieselization of terminal locomotive service. Two railroads, the Monon and the Nickel Plate, are completely dieselized, not a single steam locomotive operating in and out of Indianapolis on either road.

The yard service of the Baltimore & Ohio is entirely dieselized, and that of the New York Central practically so. The Indianapolis Union Railway has four yard diesels, and three more about to be ordered. In the near future, this railroad will be completely dieselized.

The Pennsylvania Railroad yard service is about 60 percent dieselized, but needs more diesels to clear up the Hawthorne Yard situation, which has been a thorn in our side. The Illinois Central has no diesels in its small yard. It is estimated that, as of this date, the terminal services of all railroads in the city are over 90 percent dieselized.

More Diesels

All Pennsylvania passenger trains, and about 50 percent of its freight trains passing through or terminating in the city, are not dieselized. In the not too distant future, this railroad hopes to be completely dieselized.

Three-fourths of the New York Central passenger service, and three-eights of the freight service between Cleveland and St. Louis, is dieselized, but none of the passenger or freight service between Chicago and Cincinnati is as yet dieselized.

Occasional great volumes of smoke—not necessarily of unlawful density—emitted by a group of steam locomotives in terminals, presents a particularly difficult problem to handle, but we are continually hammering away at these offenders and, with the cooperation of the railroads, eventually will get them under better control. After having been fired up, a steam locomotive is allowed to produce dense smoke for a total period of *one minute per hour,* but no longer.

The city dump yards, junk yards, and automobile wrecking companies have been brought completely under control, and it is rare that a violation is now charged against any of them. Their cooperation has been excellent and all that could be hoped for.

The public school officials are working cooperatively with us in a constant endeavor to abate smoke from public and high schools as well as libraries.

Still Many Problems

In spite of the fact that progress has been made in the abatement of smoke in the city, we still have many air pollution problems with which to contend. We have very little difficulty solving smoke problems and getting violators under control, but fly ash problems are a different matter.

Fly ash is fast becoming the major air pollution problem in the country. Manufacturers of fly ash collecting systems have spent hundreds of thousands of dollars in developing mechanical and electrostatic collecting systems of high efficiency. They are making progress, but are up against a tough problem.

Equipment of this character is extremely costly. For example, one industrial plant in the city is about to spend over $150,000 for the purchase of a collecting system to entrap cupola emission. Another has spent over $200,000 on a dust collecting system and appurtenances.

Foundries have a tough emission problem to solve. Apartment and rooming house heating furnaces employing stoker-fired boilers without dump grates are great contributors to fly ash, especially during extremely cold weather when the units are pushed to the limit.

Another annoying fly ash problem concerns the cinder emission from the remaining steam locomotives operating at the terminal yards and passing through the city, hauling freight trains principally. Eventual complete dieselization will effectually put an end to this form of pollution.

Hand-Fired Water Heaters

The use of high volatile coal in hand-fired water heaters presents another annoying smoke condition. It is impossible to fire the type of equipment with high volatile coal without the production of unlawful smoke. Smoke from this source is particularly annoying because it occurs around the clock. With the cooperation of the coal dealers and coal producers we have brought about a hundred of this class of violator under control by substituting a lower volatile coal, coke, briquettes, and other types of near smokeless fuel.

Other pollution problems with which we are wrestling are travelling firemen who service apartment and rooming house heating plants, bonfires, trash fires in domestic incinerators, steel drums, screened containers and the like; smoke produced by spreader stokers at low loads, leaf burning. We also have to contend with pollutants such as dust and dirt from unpaved streets and alleys; dust, dirt, and cinders from unpaved parking lots; pollutants from uncovered rubbish trucks; combustion products from automobiles, trucks, and buses.

Breakdowns Reported

We have agreements with many commercial and industrial plants in the city

to notify us immediately upon a mechanical breakdown in their fuel-burning system which may result in the possibility of violating the air pollution prevention ordinance.

In such cases, we give the plants all the assistance within our power and jurisdiction to get them back into proper operating condition from an air pollution prevention standpoint.

One of the more effective procedures consists of serving cease-and-desist orders. We have served 32 of these to date, and in every single instance the nuisance has been immediately and effectually abated.

As evidenced by the constantly increasing number of complaints about smoke, fumes, fly ash, etc., it is clearly apparent that the city is becoming more air pollution prevention minded. Since the first of the year, 266 such complaints have been telephoned to us, all of which were immediately investigated and, in most cases, unlawful conditions were abated.

More Power from Coal

A proposal to help small steam plants get more power from each pound of coal burned was presented before the AIME-ASME Fuels Conference at Roanoke, Va., in October by E. C. Payne, consulting engineer for the Pittsburgh Consolidation Coal Company, and an AP & SPAA member.

Mr. Payne urged the formation of a fuel and equipment consulting service, and said it was urgently needed to bring many existing small steam plants up to original design performance, and to assure plant operators the benefits of modern engineering and improved efficiency in fuel use.

An important part of the work, Mr. Payne said, would be the preparation of standardized packaged plans and specifications, pre-engineered in forms approved by the committees and made available to plant owners through consulting engineers at small cost. These packaged plans would reflect the best available engineering knowledge on fuel use, combustion and heat recovery apparatus, controls, smoke elimination, materials handling and other cost-saving devices, as well as plant layout.

ST. LOUIS BLUES

How a Great Metropolitan City Reduced its Air Pollution Radically, and the Part Dad Carter Played

It took 30 years of anti-smoke agitation to get St. Louis to pass its first smoke ordinance in 1892, and in 1926 — 34 years later — the Citizens Smoke Abatement League was formed.

That was the committee which William G. Christy, now Director of the Bureau of Smoke Control, New York, helped to organize. The first effective action, as far as legislation was concerned, was taken in 1937.

That was the year in which the present Division of Smoke Regulation as a separate unit in the Department of Public Safety was formed. Its first commissioner was Raymond R. Tucker, who had left the mechanical engineering department of Washington University in 1934 to become secretary to Mayor Bernard F. Dickmann.

The ordinance adopted that year provided for the washing of high ash, high sulfur Illinois coal under 2 in. size. The washing was contested in federal court, the claim being that it was in restraint of interstate commerce.

The court, however, ruled that this clause came within the police powers of a city attempting to regulate a nuisance, and allowed the ordinance to stand.

As soon as washing became effective, the first major improvement in the city's atmosphere was brought about. Washing greatly reduced the sulfur content of the coal, and the improvement was readily apparent to every citizen.

Ringelmann No. 3

The ordinance further defined dense smoke as being greater than No. 3 Ringelmann, and set a limit on its emission. It required approval of plans and issuance of permits for all new fuel-burning equipment, specifying that all new installations over a certain size had to be mechanically fired.

An appeal board of five members was established, and a companion ordinance was passed shortly after the smoke ordinance, providing for the licensing of all solid fuel dealers doing business in the city.

James H. Carter, Commissioner of Smoke Regulation, recalls these days vividly, for he was appointed deputy commissioner under Dr. Tucker in April, 1938, and was actively engaged in the war against smoke which came to such a successful conclusion.

Smoke Palls Continue

In the first two years of operation under this ordinance, the Division of Smoke Regulation brought about the reduction of smoke from many industrial and commercial chimneys and in the railroad yards.

This was accomplished by working individually with each plant. Also, in cooperation with those segments of the heating industry, it formulated and published standards for the installation of stokers and oil burners. Strict enforcement of these standards has played an important part in the results that were finally achieved.

But the winter smoke palls continued. The public and the press berated the Division for "doing nothing," and Tucker was called a tinkerer. In the January 15, 1940 issue of LIFE, the editors published pictures of St. Louis, calling it a "City in Decay."

It was tough for members of the Division to put up with these attitudes, particularly since remedial measures had already been formed and were under way. The causes behind St. Louis' smoke palls were well understood. It had been established that during the winter months half of all the coal consumed in the city was used in its heating plants.

With the exception of a handful of homes having oil burners or burning coke, every furnace and stove in the city was being fired with soft coal. A trip through any neighborhood, especially in the morning or evening when these plants were being tended, showed clearly enough where the greater part of the smoke was coming from.

Thousands of chimneys, each contributing its share to a total which added up

to enough to obscure the sun and require the use of street lights and headlights, could be observed any day. The impossibility of correcting those by individual action, one at a time, was clearly apparent.

The People Speak

In December, 1939, acting upon popular demand that something more effective be done, Mayor Dickmann appointed the St. Louis Committee on Elimination of Smoke. The committee was charged with the job of making a thorough study of the entire question and submitting recommendations.

Mayor Dickmann promised that, no matter what these recommendations might be, he would do all in his power to have them put into operation. The committee was headed by James L. Ford, Jr., a banker, *and not one member was connected in any way with the fuel or fuel-burning industries.*

The committee submitted its report to Mayor Dickmann the following February. After reviewing all the suggested remedies which had been offered previously, the report concluded with the recommendation that all fuel-burning plants in the city be either mechanically fired or fired by hand with smokeless fuel.

City Council, guided by the Mayor, went into action immediately. An amendment to the 1937 anti-smoke ordinance was at once prepared embracing the committee's recommendation. It was passed and signed within two months.

The amendment defined smokeless solid fuel as one containing not over 23 percent volatile matter on a dry basis, and prohibited the sale as well as the use of higher volatile coal for hand firing. "Dense" smoke was reduced in shade to anything over No. 2 Ringelmann. The washing provision for high volatile coal in sizes under 2-in. was retained.

Coal Dealers Deserve Hand

In order to put the new regulations into effect for the coming heating season, it was necessary to procure for the St. Louis market a million tons of low volatile solid fuel. Great credit should be given the retail coal industry of the city for its work in accomplishing this. The dealers were assisted by Mr. Ford's committee and the city authorities.

In the winter of 1940-41 nearly 1,250,000 tons of smokeless fuels were burned by the people of St. Louis. Only about 250,000 tons were available in the city's market when the ordinance was passed.

The results that first winter almost exceeded the hopes of the most optimistic. Whereas, during the previous heating season, the United States Weather Bureau had recorded a total of 716 hours of thick and moderate smoke, the same period a year later produced only 197 hours—a reduction of more than 72 percent.

LIFE recorded this remarkable achievement when it was announced.

This record has been bettered every heating season since, with but one exception. That was in the winter of 1943-44, when the effects of the war were most seriously felt.

Wartime Fuel Shortages

As the war progressed, it became more and more difficult to obtain sufficient quantities of smokeless fuels. The situation was met by the formation of a Citizens' War Time Fuel Committee. This group, consisting of fuel dealers, civic leaders, and city officials, worked tirelessly throughout the war and later, prodding the citizens into stocking all the coal possible during the summer months, exploring new fields for supplies, and working in close harmony with federal administrators to keep coal moving into the St. Louis market.

It was only necessary one winter to set up an emergency coal office to allot fuel to heating plants where it was most needed. No one went cold for want of coal, and the solid fuel provisions of the ordinance were never relaxed.

Opposition Bitter

Notwithstanding the beneficial results of the 1940 ordinance, it was bitterly opposed in some quarters. A case was instituted to test the constitutionality of the volatile limiting provision. The case went to the Missouri Supreme Court. But the court upheld its validity, finding that the city could enact ordinances, the purpose of which were to prevent rather than to punish the maintenance of a smoke nuisance.

James H. Carter

The 1940 amendment contained a provision limiting the discharge of fly ash from chimneys to .75 grains per cubic foot of flue gas. In 1948 this was changed by further amendment to a limit of .85 lb. of dust per 1,000 lb. of flue gas. The new amendment has been followed by a campaign of testing the chimneys of the larger plants of the city and bringing about the correction of those found in excess of the ordinance limit.

St. Louis Today

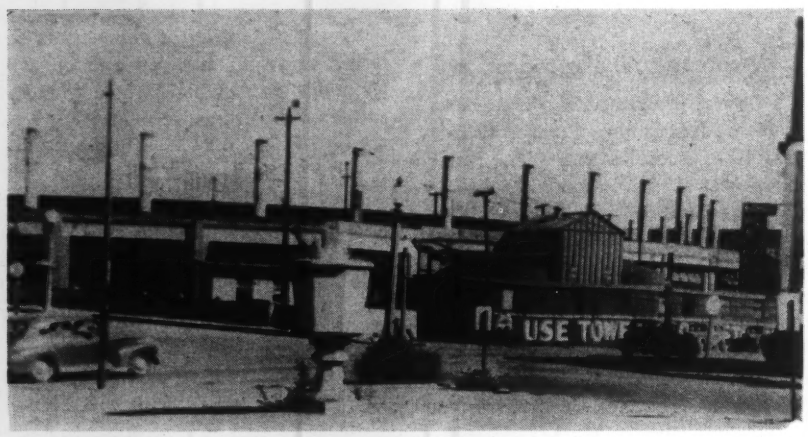
St. Louis presents a far different picture today than during those literally dark days prior to 1940. It has been years since the city has been visited by a pall of smog even reminiscent of the old days.

Natural gas was introduced into the city in 1949. In 1940 practically the entire city was heated with coal fired by hand, but today 36 percent of the homes burn gas, 21 percent oil, 12 percent use stokers, and only 31 percent are hand-fired.

Meanwhile, 14 years of constant policing of industrial and commercial chimneys and locomotives has brought them to the point where smoke violation is the exception rather than the rule. United States Weather Bureau recordings are still used as indicators of atmospheric smoke. The local office is located in the downtown section, 12 blocks from the Mississippi and three blocks from the yards which handle a major part of the rail traffic. (St. Louis is the second largest railroad center in the country.)

During the 12 months of the 1950-51 fiscal year they recorded only 3¼ hours of moderate smoke, and for the previous 12 months 3½ hours. No heavy smoke was reported in either year.

This is a grand photograph for those who belong to the school that believes in the old adage that smoke means industry and employment. The scene is the Missouri Pacific roundhouse in St. Louis in the days before smoke control. Why anyone would want to meet Looie in St. Looie when it looked like this is beyond conception.



Tucker, Christy, Carter, Dickmann—those are the names of civic-minded individuals who worked hard to bring cleaner air and sunshine to St. Louis. Note the clear skies over the Missouri Pacific roundhouse now—after the St. Louis anti-smoke ordinance had been put into effect.

The Men Behind the Program

Mr. Tucker left the Division in September, 1942 to devote full time to being a professor and heading the Department of Mechanical Engineering at Washington University. He was followed by Commissioner Robert M. Boyles, who resigned February 1, 1944. Since that time the Division has been headed by James Hinman Carter, known affectionately as "Dad" Carter to his many friends in the AP&SPAA.

"Dad" came from the Mark Twain country, having been born in Hannibal, Mo., just three years after the first anti-smoke ordinance was passed in St. Louis. He was educated in the Hannibal public schools, and was graduated from Washington University in 1920 with a degree in mechanical engineering.

He spent a year as power test engineer with the Aluminum Ore Company, a subsidiary of the Aluminum Company of America, in East St. Louis, Ill., then joined Hagenah & Erickson in Chicago as a field engineer.

After six years in Chicago, "Dad" Carter left for Sheboygan, Wis., where he was assistant and later acting general manager of the Sheboygan Lime Works. From 1933 to 1938 Mr. Carter spent time in sales work on stokers, oil burners, and other heating specialties, then joined the Division of Smoke Regulation in St. Louis, where he has been ever since, and which he now heads.

"Dad" is a member of Sigma Xi, Alpha Sigma Phi, ASME, the Engineers Club of St. Louis, the American Legion, and AP&SPAA. He is married and has one son, James Hinman, Jr.

Conference Slated

The Manufacturing Chemists' Association will hold an air pollution abatement conference at the Hotel Statler, New York, February 25 and 26. Technical sessions and a forum on "A Rational Approach to Air Pollution" will be attended by representatives of a number of industries concerned with pollution problems.

Cleaner Air Group To Hold Forty-Sixth Annual Meeting

The Smoke Abatement League of Hamilton County, Cincinnati, Ohio, will hold its 46th annual meeting on Feb. 21 in the Cincinnati Enquirer Building Auditorium.

Robert T. Griebling, Executive Secretary of the Air Pollution and Smoke Prevention Association of America, has accepted an invitation to address the meeting. He will tell of the community relations aspect of the air pollution problem, and the part that industry is contributing toward the control and diminution of air pollution.

An annual report of the activities of the league, plus the progress made during the past year in Cincinnati and Hamilton County, will be given by Charles N. Howison, Executive Secretary of the league. This report will be preceded by a regular business meeting, including the election of the trustees for the coming year.

The Smoke Abatement League, incorporated in 1906, is believed to be the oldest organization of its kind in the country.

These happy children at play are unaware of the fact that, by kicking up the dust on their playground, they are creating a nuisance. Many cities are very much concerned with the dust problem arising from playgrounds, parking lots, and coal yards.

DUSTY ANSWERS

What should be done about dust coming from playgrounds, parking lots, coal yards, and similar sources?

This is what Smoke Inspector George T. Hubbard, of Madison, Wis., had in mind when he asked the Association's advice recently.

A canvass was made among air pollution control officials the country over, and enough interesting answers were received to provide the source material for this article.

One of the best replies came froom Fred W. Classon, Air Pollution Control Official of Wyandotte, Mich. He states that in their smoke abatement ordinance there is a clause to the effect that air pollution, *from any source,* should be controlled, and that this clause would cover playground and parking lot dust.

Measurement of allowable volume, however, has not been determined, according to Mr. Classon, except, as he said, "to reach for the ultimate."

"Our experience," he continued, "is that the city should set a good example for others to follow, namely clean pavings and gutters. This calls for a street flusher, sweeping of streets, and—if by power equipment—it means regulations on parking. A power broom has to have a clear space to operate within. Dirt roads have to be dust-proofed. Oil or calcium chloride will suffice.

"Playgrounds are a dust problem. Special oil for athletic fields is available. Baseball grounds can be of grass in some instances if not used too extensively. Our Recreation Department saw fit to have grass on the infield and the outfield. Base paths are kept wetted down due to sprinkling of grass.

"Parking lots shall have a hard surface and drainage provided to the sewer. Most lots are this way. Dust proofing caused too much dirt to be dragged into stores and especially theatres. Most parking lot owners are taking care of their own problem of necessity.

"As you can see, surface dust is sometimes automatically controlled by other ordinances; one I almost forgot about is dirt falling off trucks. This is handled by other ordinances by the Police Department, although we often have to be the complainant. Most of this dust is the city's problem and surely we do not need an ordinance against ourselves."

Columbus, Ohio. Parking lot and playground dust as such is not covered in the city's smoke regulation ordinance, but in a special ordinance for the regulation of open automobile parking lots. This ordinance says in substance:

Sprinkling of the parking lot is required to lay the dirt and to prevent dust rising while the lot is in use It also provides for keeping adjacent alleys, streets, and sidewalks clean.

Whatever substance is used for sprin-

kling, it should not be injurious to automobiles or automobile tires. Those failing to cooperate will be fined from $5 to $50, depending on the gravity of the offense.

New York. The ordinance does not cover parking lots or playgrounds, but there are regulations on dust generated by the handling of fuel. Smoke from dumps is also covered, and is considered a violation the same as smoke from other sources. Local Law 5/49 declares that pollution of atmosphere by smoke, soot, fly ash, products of combustion, incomplete combustion, or heating of fuels or refuse *and certain other emissions into the atmosphere,* is a menace to the welfare and comfort of the people of the city and a cause of extensive damage to property.

The law also declares the policy of the city to establish and maintain active and continuing supervision of combustion processes, and of the emission of certain harmful *or objectionable elements into the atmosphere*. New York further defines dust as air-borne solid particles, fly ash, cinders, soot, *and all other solid particles*. The Smoke Control Bureau furthermore has established rules and regulations controlling emission into the open air from any source, including the transportation, handling, or processing of fuels.

Complaint Needed

Detroit. Sections 1.18, 1.24, and 2.2B of Ordinance No. 167-E are used to cover nuisance dusts. But, before taking action, the city must have a bona fide complaint. The Department of Buildings and Safety Engineering also requires that the pollution be judged a nuisance by the Bureau before a complaint is entered and a correction requested. A reasonable technical answer must be available before the correction can be requested.

The *Cincinnati* Building Code states: Acid or other fumes, noxious gases, strong odors, dust, dirt, or other solids in quantities emitted or allowed to escape in such place or manner as to cause injury, annoyance, or detriment to the public, or to any person or to endanger the health or safety of such a person or the public, or emitted in such a manner as to cause injury or damage to business or property, are hereby declared a nuisance, and the emission or escape thereof from any stack, or chimney, window, door, or other opening, ventilating device, or from any building, premises, or other source, shall be unlawful.

In regard to *Pittsburgh* dust nuisances where there are no direct combustion or fires producing them, the ordinance has a paragraph reading as follows: "Including the regulation of air pollution caused by soot, cinders, fly ash, noxious acids, fumes, and gases." Dr. Sumner B. Ely, Superintendent, Bureau of Smoke Prevention, feels that this statement is general enough to take care of anything of this kind, but it will often require the assistance of the Street Cleaning or Sanitary Departments. He does not believe a special clause in the ordinance is needed.

Baltimore. The dust problem is covered in a section of the City Housing Code which orders the Health Commissioner to inspect carefully all lots, grounds, suspected cellars, premises, possessions, streets, lanes, and alleys to see whether they are in a state of nuisance. If, in his opinion, they are, he must notify the owners to have the nuisance removed and abated. If this is not done, the Commissioner is empowered to remove the nuisance at the expense of the owner. Furthermore, both owners and occupiers of the premises may be fined from $10 to $100.

In *Los Angeles* action against dust nuisance is secured by interviewing a number of persons who are willing to appear in court to testify against the nuisance, thus establishing evidence for conviction.

No Ordinances

Nashville has no section in its smoke abatement ordinance covering nuisances caused by dust from parking lots, playgrounds, etc. However, the Smoke Regulation Department has at one time or another received some complaints from this source. In each case the situation could be corrected without resorting to the addition of a section to the ordinance.

Philadelphia, likewise, has nothing in its ordinance which specifically covers "surface dust" originating in parking lots, playgrounds, coal yards, etc. Complaints about this type of dust have been investigated. In many cases the nuisance could be abated in cooperation with the owners or the Highway Department. Coal piles were wetted down, parking lots were sprayed with oil. In *Evansville, Ind.*, officials believe a dust ordinance would be difficult to enforce because of the many factors involved.

Indianapolis is amending its section to include the words "dust, dirt, fly ash, mists, vapors," in addition to soot, cinders, noxious acids, fumes and gases. In *Miami*, a new smoke abatement ordinance will read somewhat as follows: all parking lots, playgrounds, coal yards, refuse dumps, etc., shall be suitably wetted down at intervals to prevent any dust nuisance.

In the opinion of John O'Hanley, Chief Smoke Inspector of *Hamilton*, Ontario, Canada, dust problems should be handled by states or provinces under the jurisdiction of the health officer.

"I would suggest," he writes, "that you advise against (including dust nuisances) in any smoke abatement ordinance. The Smoke Abatement Department in any city has more than enough headaches concerning itself with smoke problems and combustion products in the atmosphere."

Violators creating dust problems in the Province of Ontario can be prosecuted under a Public Health Act. Copies can be obtained from the King's Printer, Parliament Building, Toronto, Ontario, Canada.

Walker's Comment

"A desirable set of standards should be set up," advises R. L. Walker, Superintendent of Smoke Regulation of Nashville, "for the various types of property involved, and that property with anything less than these standards should be considered in violation.

"In other words, a commercial parking lot in a downtown area might be required to use concrete or some other hard surface type material, while a parking lot on the outskirts of the city, used for a grocery store or a doctor's office, with considerably less traffic, might be required to dustproof the surface to a somewhat lesser degree.

"Unless these nuisances are handled under a general nuisance clause of some ordinance, each type of property will have to be given separate attention."

WEAR YOUR EMBLEM

YESTERDAY—TODAY AND TOMORROW

Excerpts from an address by
R. E. HOWE
Secretary and Treasurer
Appalachian Coals, Incorporated

Before the 10th annual meeting of the Coal Producers Committee for Smoke Abatement, Cincinnati, Ohio, December 4, 1951

Yesterday

Not many men in this room can remember the time that coal was picked, mined, and loaded in railroad cars over bar screens. Everything that was black went into the cars. Smoke Abatement had never been heard of, for smokeless chimneys meant factories were not running, and people liked to see smoke belching from factory chimneys or railroad locomotives. The operators of these plants and locomotives did not realize that smoke was waste and improper combustion.

No pressure was put on the coal producer to improve his product and cleaning plants were yet to be developed. A mine could be developed and equipped for about $1.50 per annual ton. But this was not an unmixed blessing.

In recent years people became smoke conscious and this laudable purpose has been used as a vehicle for politicians to ride into office. Coal producers commenced to realize they could get a better realization for coal if it was cleaned at the mines.

Legislation

In some places politicians and do-gooders tried to sell the idea that smoke could be eliminated by legislation. About that time some politicians got the idea that drinking liquor could be eliminated by legislation. We have learned that they were wrong on both counts.

Then these same people brought forth the accusation that coal producers did not want smoke abatement. In answer the Coal Producers Committee for Smoke Abatement was formed to prove that we did.

When this committee was re-activated after the war and I was honored by being made its chairman, its activities were enlarged and we secured a number of new members which included other producing districts and some additional railroads. At that time there was considerable agitation toward the changing of its name. There was an effort to get the word "smoke" out of the name and some felt that "railroad" should be included in the name. We sent out questionnaires but no one was able to improve it. The consensus was that the name indicated its purpose—namely, that coal producers wanted smoke abatement.

Producers in Favor

One of the ideas that the new organization promoted was to eradicate the belief which the air pollution departments of many cities had, which was that coal producers were opposed to them. This has been worked on continuously and successfully by the personnel of the coal producers for smoke abatement.

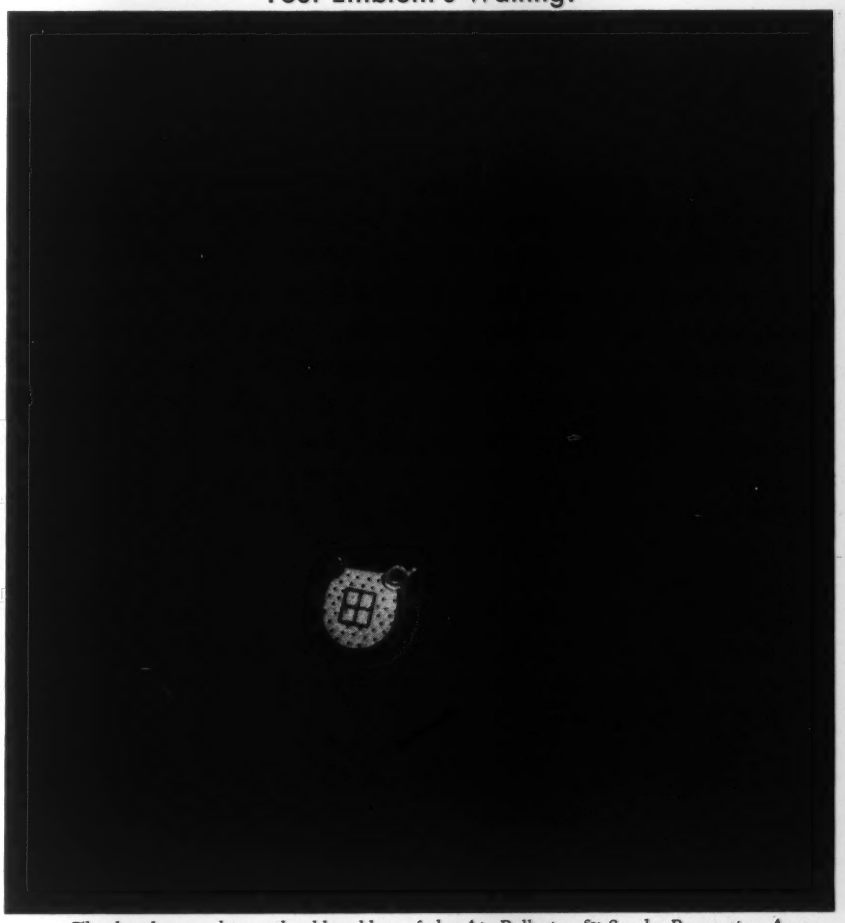
People who burn coal efficiently and make no smoke or fly ash get no publicity for it. is not news. It is the people who are careless about their heating or power plants and thereby make smoke that get the publicity, for they are the exception and therefore the makers of news.

Another plan put into effect was that a paid staff was necessary to carry out the purposes of the organization. The judgment of the committee on the idea of paid personnel and the selection of that personnel has been amply justified.

Today

With your chairman Herb Lammers, your executive secretary Al Brown, and the energetic team of Jack Vogele and Al Kiewit, this organization certainly has shown what a small force can accomplish. In expressing our appreciation to the staff, we must not fail to compliment Miss Bickett, who, if my memory serves me right, is the first paid employee of the re-activated staff.

Your Emblem's Waiting!



This handsome white-and-gold emblem of the Air Pollution & Smoke Prevention Association of America will make people sit up and take notice—if it's on your lapel! Order yours now from the Secretariat at $3.88.

Backing up this splendid staff you have a board and executive committee, together with special committees—all of high calibre men, interested in the success of your plans. Mr. George Kisker, guardian of the treasury, has become almost an institution himself.

Today there is a great change in coal preparation and mining. Today a great percentage of coal is mechanically mined and put through preparation plants. This has so increased the cost of opening a mining property that while "yesterday" it was $1.50 per annual ton, today it is as high as $10.00 per annual ton. With the improved preparation plants, the coal is delivered to the consumer in such condition that, if the consumer uses reasonable care in firing, there is no excuse for making smoke. And the consumer saves money as well, since smoke is waste.

Tomorrow

With the improved preparation of coal at the mines and the growing consciousness of the public that smoke is waste and inefficient combustion caused by improper equipment or firing, the matter is fast becoming not smoke abatement, but an effort to make the air over our cities clean, so that now you hear more about clean air than you do about smoke abatement.

In considering the "tomorrows" I believe I would be negligent of my duty as an American citizen if I did not call your attention to one of the dangers of "tomorrow", one that will eliminate all the progress we have made over the years. For several years we have been sliding down the slippery slope toward socialism at an ever-increasing rapidity. The end can be nothing less than communism. We have it in our power to stop it—if the people will take the interest it deserves in politics, including local, state and national. The person who fails in this has no right to criticize anything that is done by our public servants.

If you do not want to live in a completely regimented state, I urge you to start today, so that we may secure for tomorrow the freedoms we are already losing.

I am an optimist about "tomorrow". This great country will push forward to a new day if we will use the brains given us by the Creator and look to Him for guidance.

Hebley and Payne Honored by ASME

Henry F. Hebley, research consultant, and Earl C. Payne, consulting engineer, Pittsburgh Consolidation Coal Company, were elected fellows of the American Society of Mechanical Engineers. Both are members of AP&SPAA, and Mr. Hebley is a vice president and chairman of the Membership Committee.

Henry F. Hebley

The citation to Mr. Hebley honors him for his work in the fields of atmospheric and stream pollution. His "early conception of the real factors affecting atmospheric pollution has brought about the recent modern scientific interest and approach to the solution of the problem."

Earl C. Payne

He is also credited with encouraging a scientific approach toward the treatment of water-borne industrial trade wastes. Mr. Hebley's work in these two fields, in the view of the society, has contributed most to the profession and significantly to the public welfare."

Mr. Payne was honored for his contributions to fuel performance and for his "outstanding engineering work" in organizing and directing group "programs on research and development to advance the art and profession of fuel engineering, including both technical and economic phases."

He is acclaimed for such work as organizing the Great Lakes Air Pollution Abatement Program to reduce smoke from lake vessels, and for a number of activities in Allegheny County and elsewhere to reduce locomotive smoke and develop cinder collection and ash disposal systems.

Mr. Payne is at present leading a national movement, the society reports, to provide engineering advice to consultants and owners of small steam plants, so that they may use coal more efficiently and economically.

Men in Service

The following motion, concerning members of AP&SPAA in service, was adopted by the Board of Directors at its September 21, 1951 meeting.

Individual members called to active duty in the armed services of the United Nations may apply to the Executive Secretary for cancellation of dues for the period they are in service.

Any dues paid shall be credited on the books on a quarterly basis from the time of such application. These members will receive a special service membership card and will be carried on an inactive roster, but will not be eligible to receive any Association publications.

Such members may, within six months after being released from the services, apply to the Executive Secretary for restoration to active membership. Upon payment of prorated dues (credit being given for accredited dues mentioned above) from date of application until May 1 next following, they will receive the Association's publications and other services.

Members who enrolled in the armed services of the United Nations unknown to the Executive Secretary, and have accordingly been dropped from membership because of non-payment of dues, are entitled to have such dropped action rescinded upon application to the Secretary and presentation of satisfactory evidence of their military service.

ANNUAL MEETING NEWS

The 1952 annual meeting of the Air Pollution and Smoke Prevention Association of America will be held in the Statler Hotel, Cleveland, from June 9 to 12.

It is confidently predicted that this meeting will be better attended than even the Roanoke meeting, for which 350 persons registered.

W. O. Everling, AP&SPAA Vice President and Director of Research, American Steel & Wire Company, Cleveland, is chairman of the National Convention Committee. His vice chairman is Herbert G. Dyktor, Commissioner of the Cleveland Division of Air Pollution Control.

They submit the following tentative program:

Dr. Robert A. Kehoe, Director of the Kettering Laboratory, Cincinnati, will be one of the principal speakers. He is the author of numerous articles in scientific journals and texts of industrial toxicology and hygiene. His address will touch on the welfare hazards that could be associated with air pollution.

The Committee has arranged for committee meetings, to be held either in committee chairmen's rooms or else in small hotel parlors, if so desired. The chairmen of these committees are expected to have their reports there for final polish before presentation.

H. Kenneth Kugel, Chief Engineer, Division of Smoke Regulation and Boiler Inspection, Washington, will be in charge of the open meeting of smoke inspectors, while a restricted smoke inspectors' round table will follow the open session.

F. S. Mallette, Assistant Director of Research, American Steel and Wire Company, Cleveland, is chairman of a session embracing air pollution problems in the steel and foundry industries. K. E. Morse is co-chairman.

C. A. Gosline, of E. I. duPont deNemours & Company, Wilmington, Del., will preside over an oil and chemical program. His co-chairman is D. G. Stevens. A railroad round table will be conducted by George G. Ritchie, of the Chesapeake & Ohio Railway, Richmond, Va.

One of the four meeting days has been assigned to a discussion of solid fuel air pollution problems. The coverage will be spread over five papers, while a sixth will give the overall picture from the standpoint of solid fuel's part in the national economy.

One day will be devoted to educational trips in the Cleveland area. Visits to a steel mill, an oil refinery, an acid plant, and a fluorides manufacturer can be arranged, as well as a launch trip through the harbor and up the river to view heavy industries.

Mr. Everling will be toastmaster at the annual banquet, and will introduce Thomas A. Burke, Mayor of Cleveland, who will welcome the visitors. Dinner music will be followed by a floor show and dancing.

A special committee has been set up to provide entertainment for the ladies, who are urgently invited to attend.

Room reservations should be made directly. When making them, members should ask for a confirmation from the hotel. An adequate number of rooms have been blocked off for the meeting. However, the Committee urges early action in order to avoid possible disappointment.

Wisconsin Program Slated

A two-day program on air pollution control will be sponsored on May 27 and 28 by the Engineering Institutes of the University of Wisconsin at Madison, Wis.

The Engineering Institutes are held in cooperation with the League of Wisconsin Municipalities and are planned by the University Extension Division and the College of Engineering.

"Change," said Dean M. O. Withey, of the College of Engineering, in a joint statement with L. H. Adolfson, Director of the University Extension Division, "is one of the outstanding marks of our times. Industry, business, and the professions are experiencing manifold changes, and professional people who desire to keep pace find that refresher courses in their fields of interest are useful to them.

"To meet this educational need the University of Wisconsin is increasing constantly its programs of short, practical courses for professional people in all areas of activity."

The air pollution control program is planned for municipal staff employees, building engineers, and industrial personnel concerned with the interpretation and enforcement of smoke ordinances and the solving of air pollution problems.

Individual enrollment fees may be determined upon the basis of $5 for each day of the Institute. The registration fee is fixed by the length of the Institute and not by the number of days the enrollee attends.

Hotel expenses and meals are, of course, not included in the registration fee. Because of the demand for accom-

modations, enrollees are urged to make arrangements with a hotel as early as practicable.

Other Institutes which may be of interest to AP&SPAA members include industrial waste problems, Jan. 30, 31, and Feb. 1, and industrial fuels combustion, May 13, 14, and 15.

When Pittsburgh's first Diesel-powered commuter train rumbled through the Pennsylvania Station three weeks ago, Thomas C. Wurts, Director of Allegheny County's Bureau of Smoke Control, was at the throttle. Eighteen of these trains, soon to be in service, will completely dieselize the Pennsy's commuter service, and are part of a $60,000,000 order.

Two-Day Pollution Meeting in Trenton

A two-day statewide conference and exhibit on atmospheric pollution are scheduled to be held in Trenton, N. J., on February 19 and 20.

The objectives of the conference and exhibit are to familiarize public officials with the capacities and limitations of atmospheric pollution abatement methods and to familiarize industry with available methods and facilities for control of industrial air effluent.

The decision to hold the conference was made by representatives of industry, of municipal groups, and of state departments represented.

Dr. Daniel Bergsma, State Commissioner of Health, was elected general chairman. Dr. Geoffrey Esty, Director of the State Health Department's Division of Constructive Health, was named vice-chairman; and Dr. Miriam Sachs, Chief of the Bureau on Adult and Industrial Health, was named secretary.

Chairmen of other committees are as follows: Technical Program, C. A. Gosline of the New Jersey Chamber of Commerce; Arrangements, William A. Munroe of the Bureau on Adult and Industrial Health; Exhibit, Norman White of the New Jersey Section of the American Industrial Hygiene Association; Finance, Albert H. Acken, Secretary of the New Jersey State Chamber of Commerce; and Proceedings Publication, E. N. Heller of the New Jersey State Chamber of Commerce.

In addition to groups mentioned above, other organizations represented at the meeting included the Manufacturing Chemical Association; the American Society of Heating and Ventilating Engineers; Bituminous Coal Research, Inc.; the New Jersey State League of Municipalities; and the State Department of Conservation and Economic Development.

EDITOR'S NOTE

Starting a magazine is a good deal like having a baby. First there's the anxiety that all may not go well. Then there are the inevitable plans for the future. Then comes the "What's it going to look like?" period.

Finally, the accouchement.

As the first issue is laid on the trembling editor's desk, he looks at it disappointingly and says: "So *this* is it?" The next step — and a truly dangerous one—is to acknowledge paternity. The proud father doesn't care what the offspring looks like; he loves it for itself alone. It's *his!*

Subsequent issues, however, set the baby's character, and eventually a personality emerges. Whether it's pleasant or unpleasant depends on heredity.

Is this, we therefore ask you, the magazine you want? If not, let's change it while we can mold the young un's character. Tell us what you want to see in it. We'll do our best to provide you with a made-to-order magazine of high quality.

Ralph Bourne Promoted

Ralph W. Bourne, who has been a member of the Louisville, Ky., Smoke Commission since 1947, was promoted to Combustion Engineer when John O. Pasco, his predecessor, entered military service.

R. W. Bourne

The department he heads is now known as the Louisville Air Pollution Control Commission and is extending its activities to cover air pollution from processes other than combustion of fuels and other sources than those within the city limits.

Mr. Bourne is a native of Pennsylvania. He was graduated with a B.S. degree from the University of Pittsburgh in 1928, and obtained a position with E. I. du Pont de Nemours & Company at Belle, W. Va. Later he worked as control chemist for the Evans Lead Company, then returned to du Pont to work in pilot plant and process research.

In 1941 he was transferred to Louisville as laboratory supervisor and then as chemical engineer at the Indiana Ordnance Works, operated by du Pont across the river from Louisville. Five years later, when the ordnance works was closed, Mr. Bourne worked briefly in technical positions for the Reynolds Metals Company and the Louisville Soy Products Corporation. He joined the smoke commission in 1947.

He immediately became interested in AP&SPAA, and has numerous friends and acquaintances in the association. Mr. Bourne is married and has five children.

This is the type of ugly black smoke made when a junked auto body is burned. Multiply this single instance by the number of bodies burned every day in metropolitan communities, and you obtain some idea of the need for control of these violations.

You can be patriotic and still DO YOUR DUTY!

The shortage of steel scrap, which may reach alarming proportions, has caused a number of patriots to request that additional scrap be obtained by speeding up the demolition of automobiles in junk yards.

These "jalopies" could be prepared, according to the suggestions made, by burning away all combustible material, then compressing the bodies by dropping a two-ton piece of armor plate on them, and then hauling away the wrecks to the nearest steel mill, eight to a load.

These suggestions caused consternation in many places, since burning of auto bodies would violate the anti-smoke ordinances in many communities. An attempt was made in various quarters to get city councilmen to relax the ordinance during the emergency, but this suggestion met with heavy opposition on the part of the air pollution control officials, who did not wish to see their efforts even temporarily nullified after they had fought so hard to get the ordinances passed.

Who's Unpatriotic?

Are these officials unpatriotic, or do they just not recognize the urgency?

They recognize the urgency very well indeed, as the scores of letters testify which were received in the Secretariat. Some of them, like A. E. Robinson, Commissioner of Smoke Regulation, Kansas City, do not have the answer, but will appreciate any help that can be given them. Others have answers, some of them very good ones.

They recommend the erection of incinerators at an early date as the best way in which to handle this problem. Incinerators, of course, are not built overnight, and many owners of junk yards and automobile graveyards are not sufficiently prosperous to be able to build them.

Such persons are advised to pool their resources and build a common incinerator. The City of Cleveland just passed an ordinance making it mandatory by the end of 1952 for junk yards to have an incinerator approved by the Bureau of Smoke Abatement, if they wish to burn jalopies and other materials on their premises.

Other suggestions received include the burning of one or two bodies at a time in a non-residential open area, to burn

the bodies in the late afternoon to avoid early morning inversions and night time fire alarms, and to cut out the rubber, upholstery padding, etc., for resale. Burning the remaining wood often will not result in a smoke violation.

Burn Outside City

A number of cities, such as Pittsburgh and Louisville, suggest that scrap dealers burn their cars outside the city limits, using gasoline for firing instead of spent crankcase oil, which creates dense smoke.

Such a custom would, of course, be frowned upon by counties outside large cities that have smoke control ordinances. The objection, and suggested remedies, were well put by Thomas C. Wurts, Allegheny County's Director of the Bureau of Smoke Control, who stated:

"So far as this bureau is concerned, the burning of scrap automobiles is definitely out. We have so notified all the yards that have come to our attention within our area.

"The ultimate answer, of course, to getting the paint off is to build some form of incinerator so that the paint can be burned off and the paint fumes also burned by secondary combustion so that no smoke or noxious odors are emitted to the atmosphere.

"It has further been demonstrated by several of the yards that stripping the upholstery out of the automobile and selling it for waste can be accomplished at a profit. In other words, it costs less to strip this material from the automobile than the sale of the material will bring.

"Just what procedure can be economically worked out for the removal of the paint from the sheet metal parts of the automobile body still remains to be solved. At least one of the larger steel companies is accepting automobile bodies without paint being removed."

EXPANSION—Association business became so heavy this fall that the Secretariat had to add to its personnel. The newcomer is Ruth Heskett, left, who is going over membership records under the direction of Roberta Vetter. The photograph was taken in one of the social rooms of Mellon Institute.

Indianapolis Is Tough

J. G. Mingle, Superintendent of the Bureau of Air Pollution Prevention of Indianapolis, licked the problem for his city as long ago as November, 1950. The 22 automobile wrecking yards and 18 junk yards in Indianapolis used to burn their junk about as they pleased. To stop it, here's what Cy Mingle and his department did:

He arranged to have one large junk dealer make an agreement with the other auto wreckers to purchase their auto bodies stripped to the bare minimum. He has about 4,000 cars piled up now, and will probably erect a gas-fired incinerator in which to burn them.

The Indianapolis Fire Code prohibits the burning of cars, and also prohibits the kindling of bonfires. Upon conviction of a violation, an offender can be fined as high as $300 and jailed up to 180 days.

Another scheme used, which annoys the yards, consists of having neighbors call for a fire department pumper, which immediately extinguishes the junk yard fire, and then the fire department sends the violator a bill for $50 for fire services.

Operators Won't Comment

Auto yard operators to whom the Secretariat wrote for comment have declined to do so up to the present writing. Robert L. Chass, Assistant Director of the Los Angeles Air Pollution Control Dis-

trict, does not seem unduly alarmed. He writes:

"All salable salvage materials, such as wheels, horns, carburetors, etc., are first removed. This salvage parts operation, in most instances, comprises the major portion of the auto wreckers' business. The disposal of the actual scrap body is merely a side line which, of necessity, must be a portion of each auto wrecker's business."

Raymond E. Wetzel, Commissioner of Smoke Regulation of Evansville, Indiana, was one of those who was accused of retarding the defense effort because he refused to allow the burning of automobile bodies within the city limits.

Since the Evansville ordinance has a No. 2 smoke as the minimum violation, Mr. Wetzel allows the burning of auto bodies as long as gasoline is used. That gives the wreckers a 20 to 30 percent density and keeps them within the law.

No Exceptions

"Exceptions should be not made," writes N. F. Pitts, City Engineer, of Syracuse, "as this tends to break down enforcement."

W. N. Bates, Chief of the Fire Department and City Smoke Inspector of Elyria, O., is one of those who recommend the building of incinerators. He is worried about the junk yards which have thousands of cars rusting after all salvageable parts are removed.

"I believe," he writes," the government should get tough and order their removal to the scrap yards at a fair price, where they can be burned and cut up for shipment to the steel mills."

William G. Christy, Director of New York's Bureau of Smoke Control, provides an excellent and amusing exit-line for this article. He writes:

"It has been our experience that they (the auto junk yards) make far too much smoke. Where we observe them doing this, we give them a violation notice. This has been followed up with a court summons.

"The proper way to burn is with an incinerator. Apparently the people carrying on such a business will not spend the money for incinerators. They claim they cannot afford it. Some of the people carrying on such business here claim they may be compelled to move out of the city. This is one case where we would welcome their doing this."

Steel drum incinerator built by the Pittsburgh Barrel and Drum Company on Neville Island in the Ohio River. Stack height shown in drawing on next page.

RECONDITIONING STEEL DRUMS VIA INCINERATOR

Neville Island Operator Makes Attractive Profit

by JOSEPH J. CHIRICO
Combustion Instructor
Allegheny County Bureau of Smoke Control
Pittsburgh, Pa.

Steel drums are big business—and the reconditioning of used steel drums is also a big business. It is estimated that in 1950 more than 420,000 tons of steel were used in the manufacture of 25,000,000 new drums, and in the same period 1,000,000 tons, or 60,000,000 used drums, were reconditioned, thus conserving an equivalent tonnage of steel.

Steel drums or barrels are used for everything from asphalt base compounds to paints and foodstuffs. Great care is therefore taken in renovating these drums so that, when they are again used, they will be entirely clean and just as acceptable to the food industry or to the paint manufacturer as they are to the man who is shipping automobile muffle coats or lubricants.

Long experience has definitely indicated that one necessary step in the process of reconditioning can only be accomplished by burning. When sufficient temperature is applied to a used drum, some of the residue is softened to a point where it will drop out of the drum, but the remainder is charred to such an extent that shot-blasting will remove all traces of the contaminating material.

Residue Burned Out

In the past it had been general practice to burn out these drums by the simple method of piling them on the ground and spraying them with crude oil, kerosene, gasoline, or played-out crankcase oil, which was then ignited, and more of the same inflammable material added until the drums were completely burned out. Such a procedure, of course, violates practically any smoke control ordinance.

Entrance to incinerator, showing conveyor.

In order to overcome this, the Pittsburgh Barrel & Drum Company, located on Neville Island in the Ohio River in Allegheny County, Pennsylvania, employed a consulting engineer, and with him worked out a design of an incinerator which would accomplish this burning practice and consume all the smoke, and at the same time would affect radical economies in labor and fuel consumption for this part of their reconditioning process.

The result was the building of a gas-fired incinerator. Essentially, it consists of a conveyor, a combustion chamber, an after-burner, and a high stack. Barrels are fed into the combustion chamber by means of the conveyor where gas jets impinge on them and a temperature in the neighborhood of 1,700 deg. F. results. This temperature melts out most of the contaminating material sticking to the sides of the drums, which in turn ignites and adds its heat to the combustion process.

Smokeless Effluent

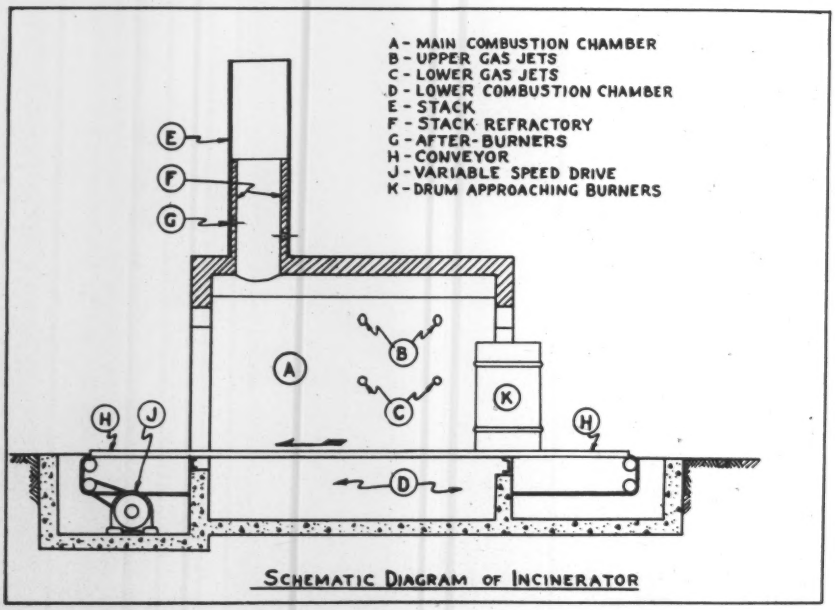
Complete combustion within the combustion chamber is not possible and these unburned products of combustion in the form of smoke are again ignited in what might be called the after-burner, consisting of gas flames located in the base of the stack. These gas burners are set at an angle in order to create maximum turbulence with the result that all hydrocarbons are consumed and the operation under proper mixture of air and heat results in a smokeless effluent.

As mentioned previously, certain of the contaminating material in the drums remains in the form of charred residue which sticks to the sides and can be readily removed in the shot-blasting process to which the drums are later subjected. The result is a container entirely acceptable for almost any type of material.

By the old method of burning drums in the open it was possible to recondition at the rate of about 200 barrels per day. With the new equipment, the minimum capacity of the incinerator will condition more than 400 barrels, with a fuel cost approximately 30 percent of what it had previously been. On this basis it is indicated that fuel saving alone in the first year should more than pay for the capital investment necessary to build the incinerator.

Big Step Forward

It is felt that this method of reconditioning steel barrels and drums is a definite forward step. A similar incinerator, somewhat larger in dimensions, can very readily be utilized in connection with the burning of automobile bodies in order to remove upholstery, wood trim, rubber tires, and other inflammable matter prior to preparing such scrap iron for baling and return to the steel companies for use in their furnaces.


A - MAIN COMBUSTION CHAMBER
B - UPPER GAS JETS
C - LOWER GAS JETS
D - LOWER COMBUSTION CHAMBER
E - STACK
F - STACK REFRACTORY
G - AFTER-BURNERS
H - CONVEYOR
J - VARIABLE SPEED DRIVE
K - DRUM APPROACHING BURNERS

SCHEMATIC DIAGRAM OF INCINERATOR

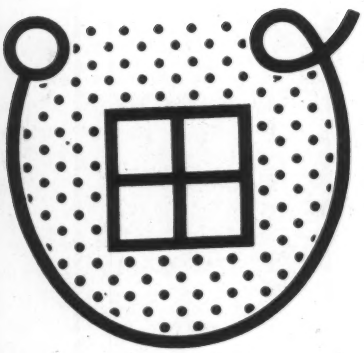
This is the type of violation which Allegheny County would not tolerate. The drum incinerator was the result.

From the economies conservatively expected in connection with the burning of steel barrels and drums, similar economies should result from a properly designed incinerator in connection with the reclamation of scrap from old automobiles. Furthermore, such a reclamation procedure on the part of the scrap dealers would result in a process which would not violate smoke control ordinances.

Membership Note

Extract from report of Thomas C. Wurts to Board of Directors, September 21, 1951.

May I impress upon each one of you the absolute necessity of obtaining more sustaining memberships in order that the usefulness of this Association may be expanded.

The Management Committee report carries in it a proposal for a very ambitious program of committees having to do with research and proper economic limits divided up by industries.

In order to have a line-up of committees function, it is absolutely essential that, in addition to our Executive Secretary, we should, just as soon as possible, engage the full-time services of a Technical Secretary whose duties would be to spark plug and keep moving the activities of these various industry committees. This cannot be attempted until we have materially increased our income.